



UNITED STATES DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration
NOAA Marine and Aviation Operations
Marine Operations Center
439 W. York Street
Norfolk, VA 23510-1114

MEMORANDUM FOR: Commander Mark Wetzler, NOAA
Commanding Officer, NOAA Ship *Okeanos Explorer*

FROM: Captain Scott M. Sirois, NOAA
Commanding Officer, NOAA Marine Operations Center-Atlantic

SUBJECT: Project Instruction for EX-16-06
CAPSTONE Wake Island Unit PRIMNM (ROV & Mapping)

Attached is the final Project Instruction for EX-16-06, CAPSTONE Wake Island Unit PRIMNM (ROV & Mapping), which is scheduled aboard NOAA Ship *Okeanos Explorer* during the period of July 27 – August 19, 2016. Of the 24 DAS scheduled for this project, 15 days are funded by a OAR Line Office Allocation and 9 DAS are funding by an NMFS Line Office Allocation. This project is estimated to exhibit a High Operational Tempo. Acknowledge receipt of these instructions via e-mail to ChiefOps.MOA@noaa.gov at Marine Operations Center-Atlantic.





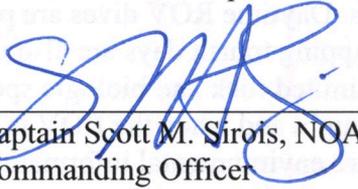
Ocean Exploration and Research

FINAL Project Instructions

Date Submitted: July 16, 2016
Platform: NOAA Ship *Okeanos Explorer*
Project Number: EX-16-06
Project Title: CAPSTONE Wake Island Unit PRIMNM (ROV & Mapping)
Project Dates: July 27 – August 19, 2016

Prepared by: Brian RC Kennedy
Expedition Coordinator
Office of Ocean Exploration & Research

Approved by:  Dated: 7/25/2016
Craig Russell
Program Manager
Office of Ocean Exploration & Research

Approved by:  Dated: 7/25/2016
Captain Scott M. Sirois, NOAA
Commanding Officer
Marine Operations Center - Atlantic

I. OVERVIEW

“America’s future depends on understanding the ocean. We explore the ocean because its health and resilience are vital to our economy and to our lives. We depend on the ocean to regulate weather and climate; sustain a diversity of life; for maritime shipping and national defense; and for food, energy, medicine, and other essential services to humankind.”

- NOAA Office of Ocean Exploration and Research Strategic Plan

A. Brief Summary and Project Period

From late July through August 2016, NOAA and partners will conduct a telepresence-enabled ocean exploration cruise on [NOAA Ship Okeanos Explorer](#) to collect critical baseline information in and around the Wake Island Unit of the Pacific Remote Islands Marine National Monument. NOAA will work with the scientific and management community to characterize unknown and poorly-known areas through telepresence-based exploration. This expedition is part of a three year Campaign to Address the Pacific monument Science, Technology, and Ocean Needs ([CAPSTONE](#)) focused on systematically collecting baseline information to support science and management needs within and around the monuments and other protected places in the Pacific, and serves as an opportunity for NOAA and the nation to highlight the uniqueness and importance of these national symbols of ocean conservation.

This document contains project instructions for EX-16-06. Operations for this cruise will include ROV, mapping, telepresence-based remote participation, and possible CTD operations. The expedition will commence in Santa Rita, Guam (13° 25.39'N , 144° 39.88'E) with operations beginning on July 27th and concluding in Kwajalein Atoll, Marshall Islands (8° 43.906'N, 167° 44.001'E) on August 19th. Operations will use the ship’s deep water mapping systems (Kongsberg EM302 multibeam sonar, EK60 split-beam fisheries sonars, ADCPs, and Knudsen 3260 chirp sub-bottom profiler sonar), NOAA’s two-body 6000 m remotely operated vehicles (ROVs *Deep Discoverer* and *Seirios*), CTD rosette, and the ship’s high-bandwidth satellite connection for real-time ship to shore communications. Daytime ROV dives are planned most days from July 30 –August 16 and a few dedicated mapping transit days are also expected. ROV dives will include high-resolution visual surveys and limited rock and biologic specimen sampling. Mapping operations will be conducted overnight and when the ROV is on deck. CTD casts may be requested during the cruise to collect more environmental information at sites of interest. Exploration operations for this cruise will focus on deep-water areas around Wake Island and along the transits from Guam to Kwajalein. This expedition will help establish a baseline of information in the region to catalyze further exploration, research and management activities.

NOAA Ship *Okeanos Explorer* systematically explores the ocean every day of every cruise to

maximize public benefit from the ship's unique capabilities. With approximately 95% of the ocean unexplored, we pursue every opportunity to map, sample, explore, and survey at planned destinations as well as during transits; "Always Exploring" is a guiding principle. An integral element of *Okeanos Explorer's* "Always Exploring" model is the ship's seafloor and water column mapping capabilities. The sonars, or a subset the sonars (EM 302, EK 60, Knudsen sub-bottom, ADCPs) on board will be operated at all times when ROV or CTD operations are not taking place, allowing for continued exploration and seabed, water column, and/or sub-bottom data collection and selected processing.

As a telepresence-enabled ROV cruise, EX-16-06 is anticipated to have a robust complement of shore-based science experts participating from their home institutions and Exploration Command Centers (ECCs) around the world. This shore-based science team will actively engage with the at-sea team in real-time using *Okeanos Explorer's* state-of-the art telepresence technology, including during ROV dives and daily ship-to-shore science planning meetings. In general, operations will focus in the areas highlighted in Figure 1.

B. Days at Sea (DAS)

Of the 24 DAS scheduled for this project, 0 DAS are funded by an OMAO allocation, 15 DAS are funded by an OAR Line Office Allocation, 9 DAS are funded by an NMFS Line Office Allocation, 0 DAS are Program Funded, and 0 DAS are other agency funded. This project is estimated to exhibit a High Operational Tempo due to daily ROV operations, nighttime mapping, and possible CTD work.

C. Operating Area

EX-16-06 of the CAPSTONE Expeditions is a telepresence-enabled ROV cruise that will focus on sites within the Wake Island unit of the Pacific Remote Islands Marine National Monument with opportunistic work conducted along the transit from Guam to Wake then again along the Wake to Kwajalein transit. The overarching themes of CAPSTONE include collecting data to address monument science and management needs; vulnerable marine habitats; seamounts within the Prime Crust Zone; and collecting information about the geologic history of the Pacific Seamounts. Additional themes for the expedition include identifying and exploring deep sea coral and bottom fish habitats.

The ship will conduct 24 hour operations consisting of daytime ROV dives and evening/nighttime mapping operations including during transit. During this cruise we will conduct primarily 8 hour ROV dives with occasional 10 hour dives on particularly interesting or deep water dive sites, as staffing allows. ROV operations will be conducted between 250 and 6,000 meters depth and will include high-resolution visual surveys and limited sample collection. Mapping operations will be conducted in 250 m of water and deeper, and include transit and overnight multibeam, water column backscatter, and sub-bottom data collection. CTD rosette operations may be requested opportunistically at selected sites where collecting the data is

considered important to understanding the physical or chemical properties of the overlying water column. The ship will shift to the UTC+12 time zone as quickly as possible to facilitate collaboration with the US mainland but still maintaining daylight for ROV deployment.

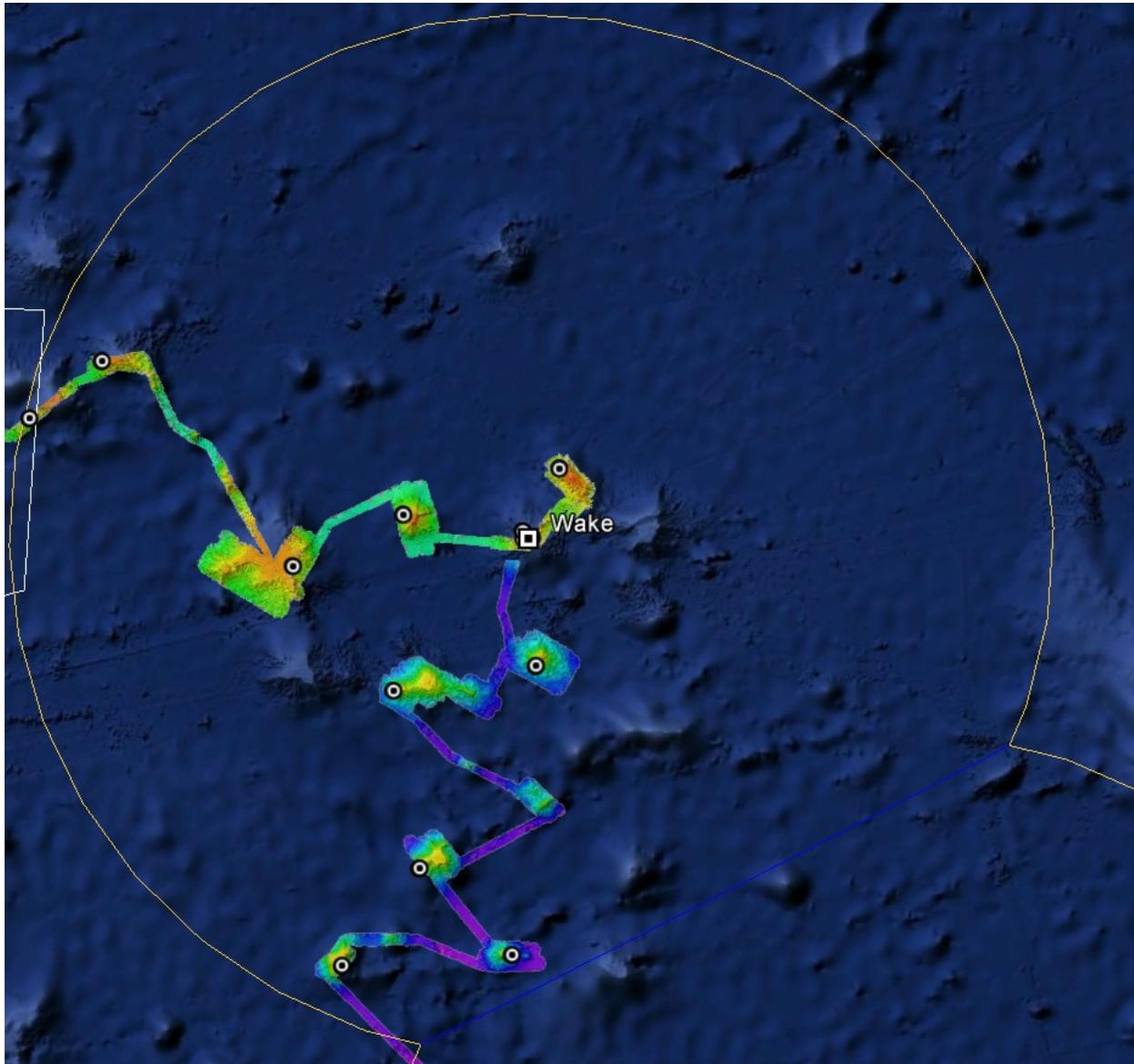


Figure 1: This figure shows the primary operating area of the *Okeanos Explorer* for EX-16-06. Circles denote possible dive sites. Image created with Google Earth Pro.

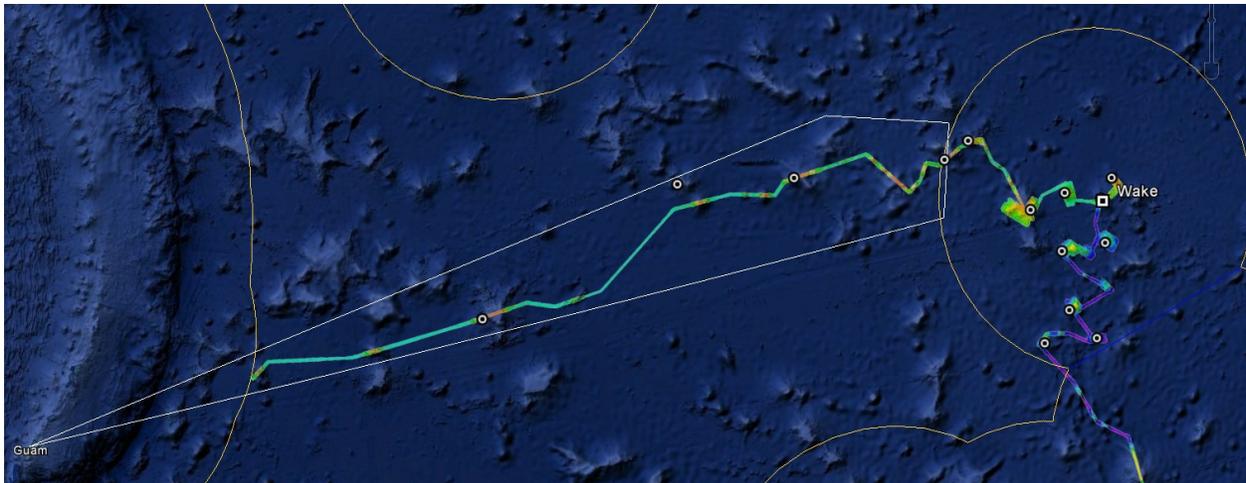


Figure 1: This figure shows the rough transit area between Guam and PRIMNM. The three circles in the white polygon are the possible ISA lease block dive targets.

Operating Area Bounding Coordinates		
ID	Latitude (N)	Longitude (E)
Eastern Operating Edge	21° 41.417'N	170° 48.261'E
Western Operating Edge	12° 57.700'N	142° 54.665'E
Northern Operating Edge	22° 53.981'N	166° 17.036'E
Southern Operating Edge	7° 40.260'N	168° 51.602'E

Table: Bounding coordinates of the general operating area for EX-16-06

D. Summary of Objectives

July 27 – August 19, 2016 (Santa Rita, Guam to Kwajalein Atoll, Marshall Islands) Telepresence-enabled ROV cruise with mapping and CTD operations

EX-16-06 operations will cover a wide area of the US EEZ in and around Wake Island and along the transits from Guam and to Kwajalein. The primary goal for this cruise is to collect baseline data and information to support priority NOAA science and management needs.

Mission objectives for EX-16-06 include a combination of operational, science, education, outreach, and data management objectives:

1. Science
 - a. Acquire data to support priority Monument science and management needs;
 - b. Explore the diversity and distribution of benthic habitats – including bottom fish habitats, deep sea and precious coral communities;

- i. Collect data on: habitat size and extent, animal diversity and density;
 - ii. Focus close-up imaging operations on potential new, rare and poorly documented animals as well as dominant members of the communities;
 - iii. Collect and preserve biological samples of potential new species, new records, dominant community members if not easily recognized, and other animals to aid in site characterization
 - c. Collect biological and geological data and samples on seamounts within the Prime Crust Zone particularly focusing on ridge tops and summit margins;
 - d. Conduct exploration of ISA lease blocks
 - e. Collect biological and geological data at sites to aid the understanding of the geologic history of the Pacific seamounts;
 - f. Continue to refine specimen collection protocols and processing procedures;
 - g. Ground-truth acoustic data using video imagery and characterize associated habitat;
 - h. Engage a broad spectrum of the scientific community and public in telepresence-based exploration;
 - i. Successfully conduct operations in conjunction with shore-based Exploration Command Centers and remote science team participants;
 - j. Create and provide input into standard science products to provide a foundation of publicly accessible data and information products to spur further exploration, research, and management activities.
 - k. Investigate potential WWII submerged cultural heritage sites near Wake Island
- 2. Remote Science/Exploration Command Centers
 - a. Provide operational support and training to scientists and managers to enable remote participation in at-sea operations;
 - b. Develop and test best practices for hosting internet-1 based live interactions;
 - c. Facilitate outreach and engagement activities and events at the ECCs;
 - d. Test and refine ship-to-shore communications procedures that engage multiple ECCs and other remote participants;
 - e. Test and refine operating procedures and products.
 - f. Test video viewing station at the Arizona Memorial in partnership with the National Park Service
- 3. ROV Engineering
 - a. Daytime ROV dives on exploration targets;
 - b. Ongoing training of pilots;
 - c. Ongoing system familiarization, documentation, and training;
 - d. Test and refine new ROV systems and pilot sampling protocol.
- 4. Video Engineering (VSAT ~15 mb/sec ship-to-shore; 2.5 mb/sec shore-to-ship)
 - a. Test terrestrial and high-speed satellite links
 - b. Support telepresence-enabled ROV operations;
 - c. Collect/create all standard video products;

- d. Continue to refine new highlight video SOPs;
 - e. Facilitate live outreach events between ship and shore;
 - f. Continue to refine protocols for using YouTube live to host live video;
 - g. Test and refine new video compression and editing hardware;
 - h. Formalize / Finalize parallel processing of imagery and video compression routines;
 - i. Develop protocols and procedure for using the Telestream video recording suite.
 - j. Test new Knight Sky VOIP system
5. Mapping
- a. Collect high resolution mapping data from sonars in priority areas as dictated by operational needs as well as science and management community needs;
 - b. Support ROV operations with mapping products and expertise;
 - c. Conduct mapping operations during transit, with possible further development of exploration targets;
 - d. Collect XBT/ Underway CTD casts as data quality requires, during mapping operations;
 - e. Create daily standard mapping products;
 - f. Collect sun photometer measurements as part of survey of opportunity;
 - g. Continue to test the integration of the new EK60 frequencies and the ADCPs.
 - h. Train new Survey Technician on mapping operations and Standard Operating Procedures.
 - i. Test new Qimera processing workflows.
 - j. Continue refining watch lead checklist.
 - k. Conduct testing of equipment and procedures to support telepresence mapping operations planned for EX-16-07.
 - i. Remote desktop access from shoreside laptop to ship's sonar and data processing computers
 - ii. SOP for sending two computer screens to shore
 - iii. Establish folder structure for sending raw multibeam .all and .wcd files to shore
6. Data Management
- a. Provide a foundation of publicly accessible data and information products to spur further exploration, research, and management activities;
 - b. Provide daily products to shore for operational decision making purposes;
 - c. Test SOP for providing sample data management support from shore;
 - d. Continue to test the ability to record high definition video footage of a full dive onboard the ship;
 - e. Test protocols and procedures for handling the data from the Telestream video recording system;
 - f. Continue to transition video procedures over to the new Telestream system and phase out use of the EVS;

- g. Develop and test protocols and procedures for handling data from pilot sampling efforts;
 - h. Cross train existing ROV dedicated personnel;
 - i. Formalize Data Management SOPs;
 - j. Continue development on real time data visualization of ROV geospatial and environmental parameters;
 - k. Ensure Marine Archology data protection protocols are followed during WWII submerged cultural heritage dives.
7. Outreach
- a. Engage the general public in ocean exploration through live video and timely content (daily updates, topical essays and web logs, highlight videos, video clips, still imagery and mapping products) posted on the Ocean Explorer website;
 - b. Host live events with VIPs;
 - c. More TBD.
8. Ship
- a. Continue to refine SOPs for the VSAT;
 - b. Provide a high quality stable internet connection with the new VSAT;
 - c. Provide stable and reliable VoIP tele communications
 - d. Continue training new deck department personnel in ROV launch and recovery.
 - e. Train new Survey Technician and familiarize him/her with Okeanos Operations and his/her responsibilities.

E. Participating Institutions

National Oceanic and Atmospheric Administration (NOAA), Office of Ocean Exploration and Research (OER)—1315 East-West Hwy, Silver Spring, MD 20910

Global Foundation for Ocean Exploration, 75 Greenmanville Ave., Mystic, CT 06355

NOAA, National Oceanographic Data Center, National Coastal Data Development Center, Stennis Space Center MS, 39529

University Corporation for Atmospheric Research Joint Office for Science Support (JOSS), PO Box 3000 Boulder, CO 80307

University of Hawai'i at Manoa- 2500 Campus Rd, Honolulu, HI 96822

University of New Hampshire (UNH) Center for Coastal and Ocean Mapping (CCOM) Jere A. Chase Ocean Engineering Lab, 24 Colovos Rd, Durham, NH 03824

University of Rhode Island, InnerSpace Center, Graduate School of Oceanography, 215 South

Ferry Rd Narragansett RI

NOAA National Marine Fisheries Service, Pacific Islands Regional Office, 1845 Wasp Blvd,
Honolulu, HI 96818

NOAA National Marine Fisheries Service, Marine National Monuments Program, 1845 Wasp
Blvd, Honolulu, HI 96818

NOAA National Marine Fisheries Service, Pacific Islands Fisheries Science Center, 1845 Wasp
Blvd, Honolulu, HI 96818

F. Personnel (Mission Party)

Table 2: Leg I – Full list of sea going mission party members and their affiliations

Name (First, Last)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
Brian Kennedy	Expedition Coordinator	7/23/16	8/22/16	M	NOAA OER/ UCAR	USA
LTJG Nick Pawlenko	Assistant Expedition Coordinator/ ROV Engineer	7/25/16	8/22/16	M	NOAA OER	USA
Lindsay McKenna	Mapping Team Lead	7/25/16	8/22/16	F	NOAA OER	USA
Chris Kelley	Biological Sciences Lead	7/25/16	8/22/16	M	JIMAR/UH	USA
Jasper Konter	Geological Sciences Lead	7/25/16	8/22/16	M	UCAR/UH	US Permanent Resident
Dan Freitas	Mapping Watch Lead	7/25/16	8/22/16	M	UCAR	USA
Joshua Carlson	Data Management	7/25/16	8/22/16	M	GFOE	USA
Dan Rogers	Engineering Group Lead	7/25/16	8/22/16	M	GFOE	USA
Jeff Laning	Engineering Group 2	7/25/16	8/22/16	M	GFOE	USA
Fernando Aragon	Engineering Group 3	7/25/16	8/22/16	M	GFOE	USA
Levi Unema	Engineering Group 4	7/25/16	8/22/16	M	GFOE	USA
Chris Ritter	Engineering Group 5	7/25/16	8/22/16	M	GFOE	USA
Andy Lister	Engineering Group 6	7/25/16	8/22/16	M	GFOE	USA
Roland Brian	Engineering Group 7	7/25/16	8/22/16	M	GFOE	USA
Annie White	Engineering Group 8	7/25/16	8/22/16	F	GFOE	USA

Emily Narrow	Engineering Group 9	7/23/16	8/22/16	F	GFOE	USA
Sean Kennison	Engineering Group 10	7/23/16	8/22/16	M	GFOE	USA
Tara Smithee	Engineering Group 11	7/25/16	8/22/16	F	GFOE	USA
Dave Casagrande	Engineering Group 12	7/23/16	8/22/16	M	GFOE	USA
Art Howard	Engineering Group 13	7/25/16	8/22/16	M	GFOE	USA

Table 3:Shore-based Science Team

Last Name	First Name	Organization
Quattrini	Andrea	Harvey Mudd College
Dieter	Bryan	PIFSC
FABIAN	GARY	NOAA Office of National Marine Sanctuaries
Rowley	Sonia	University of Hawaii at Manoa
Brian	Greene	Association for Marine Exploration
Seid	Charlotte	Ocean Genome Legacy Center at Northeastern University
Mundy	Bruce	NOAA NMFS PIFSC
Molodtsova	Tina	P.P.Shirshov Institute of Oceanology RAS
Herrera	Santiago	Lehigh University
Faulk	Kimberly	GEMS
Baco-Taylor	Amy	Florida State university
Leitner	Astrid	University of Hawaii
Miller	Joyce	University of Hawaii
Wicksten	Mary	Texas A&M University
Van Tilburg	Hans	NOAA ONMS
France	Scott	University of Louisiana at Lafayette
Mooi	Rich	California Academy of Sciences
Smith	John	Univ. Hawaii/HURL
Morgan	Nicole	Florida State University
Amon	Diva	University of Hawaii
Stevens	Bradley	Univ. of MD Eastern Shore
Rankey	Gene	University of Kansas
Fraser	John	Self
Auscavitch	Steven	Temple University
Daniel	Scheirer	USGS
Bell	Katy	OET
michael	parke	NOAA PIFSC

Hourigan	Thomas	NOAA Fisheries Deep Sea Coral Research & Technology Program
Brooke	Samantha	NOAA
Ellison	Douglas	NASA JPL
Ostermiller	Jerry	NOAA Affiliate
Damour	Melanie	Bureau of Ocean Energy Management
Gardner	Joan	Naval Research Lab and University Hawaii (HIGP)
Matsumoto	Asako	Planetary Exploration Research Center (PERC), Chiba Institute of Technology
Grussing	Valerie	NOAA
Mah	Christopher	National Museum of Natural History (Smithsonian)
Ziegler	Amanda	University of Hawaii at Manoa
Robert	McGuinn	NOAA
Greene	Brian	Association for Marine Exploration
Ford	Mike	NMFS
Sulak	Kenneth	USGS
Williams	Gary	California Academy of Sciences
Catsambis	Alexis	Naval History & Heritage Command
King	Eric	Schmidt Ocean Institute
Haddock	Steven	MBARI
King	Spencer	Oceanix
Van Tilburg	Hans	NOAA
Johnson	Hoku	NOAA/NMFS/PIFSC
Colohan	Aaron	NOAA
Wanless	Dorsey	Boise State University
Hirsh	Heidi	NOAA NMFS Monuments Program
Leitner	Astrid	University of Hawaii Manoa
Seid	Charlotte	Ocean Genome Legacy at Northeastern University
Clancey	William	Inst.Human&MachineCognition
Shor	Alexander	University of Hawaii
Zykov	Victor	Schmidt Ocean Institute
Watling	Les	University of Hawaii at Manoa
Miller	Mary	Exploratorium
Vecchione	Michael	NOAA/NMFS/NSL
Glickson	Deborah	Harbor Branch Oceanographic Institute
Barrett	Nolan	HBOI-FAU
Koppers	Anthony	CEOAS, Oregon State University
Daniel	Haddock	Forum Energy Technologies

Miller	Allison	University of Guam
Frable	Ben	Scripps Institution of Oceanography
Loricchio	Susan	Air Force Association
Jourdan	David	Nauticos
Matthews	Russ	Edward E. & Marie L. Matthews Foundation
Wahle	Charles	NOAA MPA Center
Evankow	Annie	Ocean Genome Legacy
Carney	Robert	LSU
Mckinnon	Jennifer	East Carolina University
Gawel	Michael	DOI NPS
Barrett	Nolan	HBOI FAU
Rex	Kristen	USAF 611 CES

Table 4: Shore-based Operations Team

Last Name	First Name	Organization	Area of interest or expertise.	Location
Martinez	Catalina	NOAA OER	Shore-side Ops	Rhode Island
Crum	Emily	NOAA OER	Communications Coordinator	Key West, FL
Wagner	Katie	NOAA OER	Media specialist	Silver Spring, MD
Russell	Craig	NOAA OER	Program Manager, Operations	Seattle, WA

G. Administrative

1. Points of Contact:

Ship Operations

Marine Operations Center, Atlantic (MOA)
 439 West York Street
 Norfolk, VA 23510-1145
 Telephone: (757) 441-6776
 Fax: (757) 441-6495

Chief, Operations Division, Atlantic (MOA)
 LT Joe Carrier
 Telephone: (757) 441-6842
 E-mail: Chiefops.MOA@noaa.gov

Mission Operations

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Expedition Coordinator
NOAA Office of Ocean Exploration
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LCDR James Brinkley
Acting Commanding Officer
NOAA Ship *Okeanos Explorer*
Phone: (401) 378-8284
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NOAA Office of Ocean Exploration
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O: (603) 862-5346
C: (518) 669-2285
E-mail : Lindsay.Mckenna@noaa.gov

LT(sel) Aaron Colohan, NOAA
Operations Officer
NOAA Ship *Okeanos Explorer*
Phone: (808) 659-9197 (Ship's Iridium)
E-mail: Ops.Explorerer@noaa.gov

Dan Rogers
ROV Dive Supervisor
The Global Foundation for Ocean Exploration
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E-mail : daniel.rogers@tgfoe.org

Other Mission Contacts

John McDonough, Deputy Director
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Craig Russell
Program Manager
NOAA Ocean Exploration & Research
Phone: (206) 526-4803 / (206) 518-1068
E-mail: Craig.Russell@noaa.gov

Dave Loyalvo
President
The Global Foundation for Ocean Exploration
Phone : (203)2465-5531
E-mail : david.loyalvo@tgfoe.org

Vessel shipping address:

Shipments:

Send an email to the *Okeanos Explorer* Operations Officer at OPS.Explorer@noaa.gov indicating the size and number of items being shipped.

Items sent to Guam should arrive at the below address prior to COB July 25, 2016.

SW3147
DLA DISTRIBUTION GUAM MARIANAS
DDGM RECEIVING SUMMAY DRIVE
WHSE 9 BLDG 2118
SANTA RITA GU 96915-1000
M/F: NOAA OKEANOS EXPLORER, ATTN FIRST/LAST NAME

1. Diplomatic Clearances

This project involves Marine Scientific Research in waters under the jurisdiction of Marshall Islands. Diplomatic clearance has been approved under US Diplomatic Note 15-105 (Appendix F).

2. Licenses and Permits

In order to support or conduct Marine Scientific Research within the U.S. EEZ, work funded, authorized and/or conducted by the NOAA must be compliant with the National Environmental Policy Act (NEPA). NOAA Administrative Order (NAO) 216-6 describes NOAA's specific obligations with regard to NEPA compliance. Among these is the need to review all NOAA-supported projects with respect to their environmental consequences. In compliance with NAO 216-6 and NEPA, a memorandum describing the project's scientific sensors' possible effects on the environment has been submitted for the project. As expected with ocean research with limited time or presence in the marine environment, the project has been determined to not have the potential to result in any lasting changes to the environment. As defined in Sections 5.05 and 6.03.c.3 (a) of NAO 216-6, this is a research project of limited size or magnitude or with only short-term effects on the environment and for which any cumulative effects are negligible, and as such, the project is categorically excluded from the need to prepare a full-scale NEPA environmental assessment. The categorical exclusion met the requirements of NAO 216-6 and NEPA, and authorizes the Marine Scientific Research conducted for the project.

Additionally, informal consultation was initiated under Section 7 of the Endangered Species Act (ESA), requesting NOAA Fisheries' Protected Resources Division concurrence with our biological evaluation determining that 2016 Marianas Expedition and all other planned *Okeanos Explorer* operations during the 2016-17 field season, may affect, but are not likely to adversely affect, ESA-listed marine species. The informal consultation was completed on February 3, 2016 when NOAA OER received a signed letter from the Regional Administrator of NMFS Pacific Islands Regional Office, stating that NMFS concurs with OER's determination that conducting proposed *Okeanos Explorer* cruises are not likely to adversely affect ESA-listed marine species.

II. OPERATIONS

The Expedition Coordinator is responsible for ensuring the scientific staff are trained in planned operations and are knowledgeable of project objectives, priorities and environmental compliance procedures. The Commanding Officer is responsible for ensuring all operations conform to the ship's accepted practices and procedures.

A. **Project Itinerary** *(All times and dates are subject to prevailing conditions and the discretion of the Commanding Officer)*

We will conduct primarily 8 hour ROV dives with a few longer dives as staffing allows. CTD casts are planned, subject to staffing availability.

Table 4: EX1606 Detailed Itinerary

This is an approximate itinerary and is subject to change. A draft dive schedule is expected to be generated on June 6th once feedback from the science community has been received regarding additional targets.

Mainland US Date	Ship Date	Activity	Notes and Requirements
7/23/2016	Sunday, July 24, 2016	Crew Rest. New mission personnel will start arriving.	Crew Rest
7/24/2016	Monday, July 25, 2016	Crew Rest. The remaining mission personnel arrive	Train new mission personnel and crew rest
7/25/2016	Tuesday, July 26, 2016	Pre Cruise mobilization	Train new mission personnel and crew rest
7/26/2016	Wednesday, July 27, 2016	Depart Guam	Get underway
7/27/2016	Thursday, July 28, 2016	Mapping transit	Transit
7/28/2016	Friday, July 29, 2016	Mapping transit	Transit Time Zone change to UTC +11
7/29/2016	Saturday, July 30, 2016	Dive 1	Russian ISA lease block
7/30/2016	Sunday, July 31, 2016	Mapping transit	Transit Time Zone change to UTC +12
7/31/2016	Monday, August 01, 2016	Dive 2	Japanese ISA Lease Block
8/1/2016	Tuesday, August 02, 2016	Dive 3	Japanese ISA Lease Block
8/2/2016	Wednesday, August 03, 2016	Mapping transit	Transit
8/3/2016	Thursday, August 04, 2016	Dive 4	Normal Dive
8/4/2016	Friday, August 05, 2016	Dive 5	Normal Dive

8/5/2016	Saturday, August 06, 2016	Dive 6	Normal Dive
8/6/2016	Sunday, August 07, 2016	Dive 7	Normal Dive
8/7/2016	Monday, August 08, 2016	Dive 8	NW of Wake Island
8/8/2016	Tuesday, August 09, 2016	Dive 9	Normal Dive Possible Shipwreck dive Live interactions
8/9/2016	Wednesday, August 10, 2016	Dive 10	NE of Wake Island
8/10/2016	Thursday, August 11, 2016	Dive 11	Normal Dive
8/11/2016	Friday, August 12, 2016	Dive 12	Normal Dive
8/12/2016	Saturday, August 13, 2016	Dive 13	Normal Dive live interactions with the Exploratorium
8/13/2016	Sunday, August 14, 2016	Dive 14	Normal Dive
8/14/2016	Monday, August 15, 2016	Dive 15	Normal Dive
8/15/2016	Tuesday, August 16, 2016	Dive 16	Normal Dive followed by long transit
8/16/2016	Wednesday, August 17, 2016	Mapping transit	inside the Marshall Island's EEZ
8/17/2016	Thursday, August 18, 2016	Mapping transit	inside the Marshall Island's EEZ
8/18/2016	Friday, August 19, 2016	Arrive Kwajalein	Some EX1606 mission personnel depart. Some EX1607 mission personnel arrive
8/19/2016	Saturday, August 20, 2016	Demob	Some mission personnel depart
8/20/2016	Sunday, August 21, 2016	Demob	
8/21/2016	Monday, August 22, 2016	Demob	Majority of Mission personnel depart

Inport Activities Schedule

Please note- this schedule is still tentative until we have confirmation from the ship and the port that this schedule is acceptable. Ship tours are the only activities that require direct support from the ship.

B. Staging and Destaging

- A. Minimal mobilization will be required because ROV equipment will be onboard from a previous cruise.
- B. Minimal demobilization will be required because nearly all equipment and samples will remain on board until the ship reaches Honolulu.

C. Operations to be Conducted

Telepresence Events

- A. August 9th – live viewing station set up at the Arizona Memorial
- B. August 13th- Two live interactions with the Exploratorium
- C. Date TBD- Live interaction with the NOAA Gateway Center

In-Port Events

- A. None planned at this time

D. SCUBA Dive Plan

All dives are to be conducted in accordance with the requirements and regulations of the NOAA Diving Program (<http://www.ndc.noaa.gov/dr.html>) and require the approval of the ship's Commanding Officer.

No SCUBA dives are currently planned for this cruise.

E. Applicable Restrictions

Sonar Operations

EM 302, EK 60, ADCP, and sub-bottom profiler data acquisition is planned for this cruise. All data acquisition will be conducted in accordance with established standard operating procedures under the direction of the mapping team lead. These operating procedures will include protection measures when operating in the vicinity of marine mammals, sea turtles or Endangered Species Act-listed species as described in appendices D and E. The final decision to operate and collect 24-hour sub-bottom profiler data will be at the discretion of the Commanding Officer.

III. EQUIPMENT

A. Equipment and capabilities provided by the ship

- Kongsberg EM302 MultibeamEchosounder (MBES)
- Simrad EK60DeepwaterEchosounders and GPTs (18, 70, 120, 200 kHz)
- Knudsen Chirp 3260 Sub-bottom profiler (SBP)
- Teledyne RDI Workhorse Mariner (300 kHz) ADCP
- Teledyne RDI Ocean Surveyor (38 kHz) ADCP
- Teledyne UnderwayCTD

- LHM Sippican XBT (Deep Blue probes)
- Seabird SBE 911Plus CTD
- Seabird SBE 32 Carousel and 24 2.5 L Niskin Bottles
- Light Scattering Sensor (LSS)
- Oxidation – Reduction Potential (ORP)
- Dissolved Oxygen (DO) sensor
- Altimeter Sensor and battery pack
- CNAV GPS
- POS/MV
- Seabird SBE-45 (Micro TSG)
- Kongsberg Dynamic Positioning-1 System
- NetApps mapping storage system
- CARIS HIPS Software
- QPS Fledermaus Software
- QPS Qimera Software
- SIS Software
- Hypack Software
- Scientific Computing System (SCS)
- ECDIS
- Met/Wx Sensor Package
- Telepresence System
- VSAT High-Speed link (Comtech 15 Mbps ship to shore; 2.54 Mbps shore to ship)
- Cruise Information Management System (CIMS)
- Three VoIP telephone lines
- NOAA OER 6000 m *Deep Discoverer* ROV
- NOAA *Seirios* Camera Platform

B. Equipment and capabilities provided by the scientists

- Microtops II Ozone Monitor Sunphotometer and handheld GPS required for NASA Marine Aerosols Network supplementary project.
- Equipment associated with new sampling protocol
- Teledyne UnderwayCTD

IV. HAZARDOUS MATERIALS

A. Policy and Compliance

The Expedition Coordinator is responsible for complying with FEC 07 Hazardous Materials and Hazardous Waste Management Requirements for Visiting Scientific Parties (or the OMAO procedure that supersedes it). The Expedition Coordinator and Science Team Lead will be responsible for transporting all samples and HAZMAT on and off the ship. By Federal regulations and NOAA Marine and Aviation Operations policy, the ship may not sail without a complete inventory of all hazardous materials by name and quantity, MSDS, appropriate spill cleanup materials (neutralizing agents, buffers, or

absorbents) in amounts adequate to address spills of a size equal to the amount of chemical brought aboard, and chemical safety and spill response procedures. Documentation regarding those requirements will be provided by the Chief of Operations, Marine Operations Center, upon request.

Per OMAO procedure, the scientific party will include with their project instructions and provide to the CO of the respective ship 30 days before departure:

- List of chemicals by name with anticipated quantity
- List of spill response materials, including neutralizing agents, buffers, and absorbents
- Chemical safety and spill response procedures, such as excerpts of the program’s Chemical Hygiene Plan or SOPs relevant for shipboard laboratories
- For bulk quantities of chemicals in excess of 50 gallons total or in containers larger than 10 gallons each, notify ship’s Operations Officer regarding quantity, packaging and chemical to verify safe stowage is available as soon as chemical quantities are known.

Upon embarkation and prior to loading hazardous materials aboard the vessel, the scientific party will provide to the CO or their designee:

- An inventory list showing actual amount of hazardous material brought aboard
- An MSDS for each material
- Confirmation that neutralizing agents and spill equipment were brought aboard sufficient to contain and cleanup all of the hazardous material brought aboard by the program
- Confirmation that chemical safety and spill response procedures were brought aboard

Upon departure from the ship, scientific parties will provide the CO or their designee an inventory showing that all chemicals were removed from the vessel. The CO’s designee will maintain a log to track scientific party hazardous materials. MSDS will be made available to the ship’s complement, in compliance with Hazard Communication Laws.

Scientific parties are expected to manage and respond to spills of scientific hazardous materials. Overboard discharge of hazardous materials is not permitted aboard NOAA ships.

B. Inventory

Item	Use	Approx. locations
95% Denatured Ethanol (10 gallons)	Sample preservation	Wetlab, under the chemical hood
10% Buffered Formalin (3 gallons)	Sample preservation	Wetlab, under the chemical hood
Chaos Buffer (0.5 gallons) (4 M guanidine thiocyanate, 0.5% N-laurosyl sarcosine,	Sample preservation (genetics)	Wetlab, under the chemical hood

25 mM Tris pH 8.0, 0.1 M beta-mercaptoethanol)		
Aqua Shield	Underwater Lubricant	ROV Workshop Fire Cabinet, Pit
Dow Corning 4	Electrical insulating compound	ROV Workshop Fire Cabinet, Pit
Fluid Film Spray	Silicone Lubricant	ROV Workshop Fire Cabinet
Isopropanol Alcohol	Solvent	ROV Workshop Fire cabinet
Scotchkote	Electrical insulating compound	ROV Workshop Fire cabinet
3M Silicone Spray	Silicone Lubricant	ROV Workshop Fire cabinet
Synthetic AW Hydraulic Oil, ISO-22	Amsoil (AWG-05)	Hanger, Pit, Vehicles
Tap Magic Cutting Fluid	Cutting/Machining Lubricant	ROV Workshop Fire cabinet
Tap Magic Heavyweight Cutting Fluid	Cutting/Machining Lubricant	ROV Workshop Fire cabinet
Tuff Coat M	Marine Lubricant	ROV Workshop Fire cabinet
Dow Corning Molykote 111	Valve Lubricant and Sealant	ROV Workshop Fire cabinet, Pit
WD40	Lubricant	ROV Workshop Fire cabinet
Loktite	Bolt adhesive	ROV Workshop Fire cabinet
Mineral Oil	Vitrea	Hanger, Vehicles
Por-15	Paint Kit	ROV Workshop Fire cabinet
Univis HVI 13	Hydraulic Fluid	Hanger, ROV D2
Ultratane	Butane fuel	ROV Workshop fire cabinet
Rust-oleum	Protective Enamel	ROV Workshop fire cabinet
Flux-Off	Soldering Flux remover	ROV Workshop fire cabinet
Propane	Torch Fuel	ROV Workshop fire

C. Chemical safety and spill response procedures

- A. All safety and spill response procedures will be handled according to OMAO guidelines and following the manufacturers MSDS which has been provided to the ship's ECO.

D. Radioactive Materials

NOT APPLICABLE TO THIS CRUISE

V. ADDITIONAL PROJECTS

A. Supplementary Projects

NASA Maritime Aerosol Network

During the cruise the marine aerosol layer observations will be collected for the NASA Maritime Aerosol Network (MAN). Observations will be made by mission personnel (as time allows) with a sun photometer instrument provided by the NASA MAN program. Resulting data will be delivered to the NASA MAN primary investigator Alexander Smirnov by the Expedition Coordinator. All collected data will be archived and publically available at:

http://aeronet.gsfc.nasa.gov/new_web/maritime_aerosol_network.html

Equipment resides on the ship and is stewarded by the Expedition Coordinator.

See Appendix F for full Survey of Opportunity Form.

B. NOAA Fleet Ancillary Projects

No NOAA Fleet Ancillary Projects are planned.

VI. DISPOSITION OF DATA AND REPORTS

A. Data Responsibilities

All data acquired on *Okeanos Explorer* will be provided to the public archives without proprietary rights. All data management activities shall be executed in accordance with NAO 212-15, Management of Environmental and Geospatial Data and Information

[http://www.corporateservices.noaa.gov/ames/administrative_orders/chapter_212/212-15.html].

Ship Responsibilities

The Commanding Officer is responsible for all data collected for missions until those data have been transferred to mission party designees. Data transfers will be documented on NOAA Form 61-29. Reporting and sending copies of project data to NESDIS (ROSCOP form) is the responsibility of OER.

NOAA OER Responsibilities

The Expedition Coordinator will work with the *Okeanos Explorer* Operations Officer to ensure data pipeline protocols are followed for final archive of all data acquired on *Okeanos Explorer* without proprietary rights. See Appendix B for detailed data management plans.

Deliverables

- a. At sea
 - Daily plans of the Day (POD)
 - Daily situation reports (SITREPS)
 - Daily summary bathymetry data files
 - Summary forms for each ROV dive
 - Summary files for each sample collection
 - Summary forms for each CTD rosette cast
- b. Post cruise
 - Refined SOPs for all pertinent operational activities
 - Assessments of all activities
- c. Science
 - Multibeam and XBT raw and processed data (see appendix B for the formal cruise data management plan)
 - EK 60 raw data
 - Knudsen 3260 sub-bottom profiler raw data
 - Summary file with all sample data
 - Mapping data report
 - Cruise Report

Archive

- OER and ship will work together to ensure documentation and stewardship of acquired data sets in accordance with NAO 212-15. The Cruise Information Management System is the primary tool used to accomplish this activity.

VII. Meetings, Vessel Familiarization, and Project Evaluations

Shipboard Meetings

A safety brief and overview of POD will occur on the Bridge each morning at 0800 or another time as set by the CO. Daily Operations Briefing meetings will be held at 1330 to review the current day, and define operations, associated requirements, and staffing needs for the following day. A Plan of the Day (POD) will be posted each evening for the next day in specified locations throughout the ship. Daily Situation Reports (SITREPS) will be posted as well and shared daily through e-mail.

- A. Pre-Project Meeting: The Expedition Coordinator and Commanding Officer will conduct a meeting of pertinent members of the scientific party and ship's crew to discuss required equipment, planned operations, concerns, and establish mitigation strategies for all concerns. This meeting shall be conducted before the beginning of the project with sufficient time to allow for preparation of the ship and project personnel. The ship's Operations Officer usually is delegated to assist the Expedition Coordinator in arranging this meeting.

- B. Vessel Familiarization Meeting: The Commanding Officer is responsible for ensuring scientific personnel are familiarized with applicable sections of the standing orders and vessel protocols, e.g., meals, watches, etiquette, drills, etc. A vessel familiarization meeting shall be conducted in the first 24 hours of the project's start and is normally presented by the ship's Operations Officer.
- C. Post-Project Meeting: The Commanding Officer is responsible for conducting a meeting no earlier than 24 hrs before or seven days after the completion of a project to discuss the overall success and short comings of the project. Concerns regarding safety, efficiency, and suggestions for future improvements shall be discussed and mitigations for future projects will be documented for future use. This meeting shall be attended by the ship's officers, applicable crew, the Expedition Coordinator, and members of the scientific party and is normally arranged by the Operations Officer and Expedition Coordinator.
- D. Project Evaluation Report:
Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Expedition Coordinator. The form is available at <http://www.oma.noaa.gov/fleeteval.html> and provides a "Submit" button at the end of the form. Submitted form data is deposited into a spreadsheet used by OMAO management to analyze the information. Though the complete form is not shared with the ships, specific concerns and praises are followed up on while not divulging the identity of the evaluator.

VIII. MISCELLANEOUS

A. Meals and Berthing

The ship will provide meals for the scientists listed above. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the project, and ending two hours after the termination of the project. Since the watch schedule is split between day and night, the night watch may often miss daytime meals and will require adequate food and beverages (for example a variety of sandwich items, cheeses, fruit, milk, juices) during what are not typically meal hours. Special dietary requirements for scientific participants will be made available to the ship's command at least twenty-one days prior to the survey.

Berthing requirements, including number and gender of the scientific party, will be provided to the ship by the Expedition Coordinator. The Expedition Coordinator and Operations Officer will work together on a detailed berthing plan to accommodate the gender mix of the scientific party taking into consideration the current make-up of the ship's complement. The Expedition Coordinator is responsible for ensuring the scientific berthing spaces are left in the condition in which they were received; for stripping bedding and linen return; and for the return of any room keys which were issued. The Expedition Coordinator is also responsible for the cleanliness of the laboratory spaces and the storage areas utilized by the scientific party, both during the cruise and at its conclusion prior to departing the ship.

All NOAA scientists will have proper travel orders when assigned to any NOAA ship. The Expedition Coordinator will ensure that all non-NOAA or non-Federal scientists aboard also have proper orders. It is the responsibility of the Expedition Coordinator to ensure that the entire scientific party has a mechanism in place to provide lodging and food and to be reimbursed for these costs in the event that the ship becomes uninhabitable and/or the galley is closed during any part of the scheduled project.

All persons boarding NOAA vessels give implied consent to comply with all safety and security policies and regulations which are administered by the Commanding Officer. All spaces and equipment on the vessel are subject to inspection or search at any time. All personnel must comply with OMAO's Drug and Alcohol Policy dated May 7, 1999 which forbids the possession and/or use of illegal drugs and alcohol aboard NOAA Vessels.

B. Medical Forms and Emergency Contacts

The NOAA Health Services Questionnaire (NHSQ, NF 57-10-01 (3-14)) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Expedition Coordinator or the NOAA website

<http://www.corporateservices.noaa.gov/noaaforms/eforms/nf57-10-01.pdf>.

All NHSQs submitted after March 1, 2014 must be accompanied by [NOAA Form \(NF\) 57-10-02 - Tuberculosis Screening Document](#) in compliance with OMAO Policy 1008 (Tuberculosis Protection Program).

The completed forms should be sent to the Regional Director of Health Services at the applicable Marine Operations Center. The NHSQ and Tuberculosis Screening Document should reach the Health Services Office no later than four weeks prior to the start of the project to allow time for the participant to obtain and submit additional information should health services require it, before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of either form. Ensure to fully complete each form and indicate the ship or ships the participant will be sailing on. The participant will receive an email notice when medically cleared to sail if a legible email address is provided on the NHSQ.

The participant can mail, fax, or email the forms to the contact information below. Participants should take precautions to protect their Personally Identifiable Information (PII) and medical information and ensure all correspondence adheres to DOC guidance (http://ocio.os.doc.gov/ITPolicyandPrograms/IT_Privacy/PROD01_008240).

The only secure email process approved by NOAA is Accellion Secure File Transfer which requires the sender to setup an account. Accellion's Web Users Guide is a valuable aid in using this service, however to reduce cost the DOC contract doesn't provide for automatically issuing full functioning accounts. To receive access to a "Send Tab," after your Accellion account has been established send an email from the associated email account to accellionAlerts@doc.gov requesting access to the "Send Tab" function. They will notify you via email, usually within one business day of your approval. The "Send Tab" function will be accessible for 30 days.

Contact information:

Regional Director of Health Services
Marine Operations Center – Atlantic
439 W. York Street
Norfolk, VA 23510
Telephone (757) 441.6320
Fax (757) 441.3760
E-mail: MOA.Health.Services@noaa.gov

Please make sure the medicalexplorer@noaa.gov email address is cc'd on all medical correspondence.

Prior to departure, the Expedition Coordinator must provide a listing of emergency contacts to the Operations Officer for all members of the scientific party, with the following information: name, address, relationship to member, and telephone number.

Emergency contact form is included as Appendix A.

C. Shipboard Safety

Hard hats are required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

Wearing open-toed footwear or shoes that do not completely enclose the foot (such as sandals or clogs) outside of private berthing areas is not permitted. Steel-toed shoes are required to participate in any work dealing with suspended loads, including CTD deployments and recovery. The ship does not provide steel-toed boots. Hard hats are also required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

Operational Risk Management: For every operation to be conducted aboard the ship (NOAA-wide initiative), risk management procedures will be followed. For each operation, risks will be identified and assessed for probability and severity. Risk mitigation strategies/measures will be investigated and implemented where possible. After mitigation, the residual risk will have to be assessed to make Go-No Go decisions for the operations. Particularly with new operations, risk assessment will be ongoing and updated as necessary. This does not only apply to over-the-side operations, but to everyday tasks aboard the vessel that pose risk to personnel and property.

- CTD, ROV (and other pertinent) ORM documents will be followed by all personnel working onboard *Okeanos Explorer*.
- All personnel onboard are in the position of calling a halt to operations/activities in the event of a safety concern.

D. Communications

A daily situation report (SITREP) on operations prepared by the Expedition Coordinator will be relayed to the program office. Sometimes it is necessary for the Expedition Coordinator to communicate with another vessel, aircraft, or shore facility. Through various modes of communication, the ship is able to maintain contact with the Marine Operations Center on an as

needed basis. These methods will be made available to the Expedition Coordinator upon request, in order to conduct official business. The ship's primary means of communication with the Marine Operations Center is via e-mail and the Very Small Aperture Terminal (VSAT) link. VSAT bandwidth at 15Mbps will be paid by OER and provided by OMAO.

Specific information on how to contact NOAA Ship *Okeanos Explorer* and all other fleet vessels can be found at <http://www.moc.noaa.gov/MOC/phone.html#EX>

Important Telephone and Facsimile Numbers and E-mail Addresses

Ocean Exploration and Research (OER):

OER Program Administration:
Phone: (301) 734-1010
Fax: (301) 713-4252
E-mail: Firstname.Lastname@noaa.gov

University of New Hampshire, Center for Coastal and Ocean Mapping

Phone: (603) 862-3438
Fax: (603) 862-0839

NOAA Ship *Okeanos Explorer* - Telephone methods listed in order of increasing expense:

Okeanos Explorer Cellular: (401) 713-4114
Okeanos Explorer Iridium: (808) 659-9179
OER Mission Iridium (dry lab): (808) 851-3827

EX INMARSAT B

Line 1: 011-870-764-852-328
Line 2: 011-870-764-852-329

Voice Over IP (VoIP) Phone:

(541) 867-8932
(541) 867-8933
(541) 867-8934

E-Mail: Ops.Explorer@noaa.gov - (mention the person's name in SUBJECT field)

expeditioncoordinator.explorer@noaa.gov For dissemination of all hands emails by Expedition Coordinator while onboard. See ET for password.

E. IT Security

1. Any computer that will be hooked into the ship's network must comply with the *OMAO Fleet IT Security Policy* 1.1 (November 4, 2005) prior to establishing a direct connection to the NOAA WAN. Requirements include, but are not limited to: Installation of the

latest virus definition (.DAT) file on all systems and performance of a virus scan on each system.

2. Installation of the latest critical operating system security patches.
3. No external public Internet Service Provider (ISP) connections.

Completion of these requirements prior to boarding the ship is required.

Non-NOAA personnel using the ship's computers or connecting their own computers to the ship's network must complete NOAA's IT Security Awareness Course within three days of embarking.

F. Foreign National Guests Access to OMAO Facilities and Platforms

No Foreign National Guest will require access during this expedition.

Appendix A

EMERGENCY CONTACT DATA SHEET

NOAA OKEANOS EXPLORER

Scientists sailing aboard the *Okeanos Explorer* should fill out the form found at the following link location:

https://docs.google.com/a/noaa.gov/forms/d/1pcoSgPluUVxaY64CM1hJ7511iIYirTk48G-lv37Am_k/viewform with their emergency contact information

Appendix B: Data Management Plan

Data Management Plan

Okeanos Explorer (EX1606): CAPSTONE Wake Island Unit PRIMNM



OER Data Management Objectives

Standard Operating Procedures onboard the ship and throughout the ship's established data pipelines will be followed to ensure the data from this mission is organized, documented and archived within 30-90 days of cruise end.

12-Jul-16

Page 1

1. General Description of Data to be Managed

1.1 Name and Purpose of the Data Collection Project

Okeanos Explorer (EX1606): CAPSTONE Wake Island Unit PRIMNM

1.2 Summary description of the data to be collected.

Operations will use the ship's deep water mapping systems (Kongsberg EM302 multibeam sonar, EK60 split-beam fisheries sonars, ADCPs, and Knudsen 3260 chirp sub-bottom profiler sonar), NOAA's two-body 6000 m remotely operated vehicle (ROVs Deep Discoverer and Seirios), CTD rosette, and the ship's high-bandwidth satellite connection for real-time ship to shore communications. Daytime ROV dives are planned most days from July 28 –August 16th a few dedicated mapping transit days are also expected. ROV dives will include high-resolution visual surveys and limited rock and biologic specimen sampling. Mapping operations will be conducted overnight and when the ROV is on deck. CTD casts may be requested during the cruise to collect more environmental information at sites of interest.

1.3 Keywords or phrases that could be used to enable users to find the data.

expedition, exploration, explorer, marine education, noaa, ocean, ocean discovery, ocean education, ocean exploration, ocean exploration and research, ocean literacy, ocean research, OER, science, scientific mission, scientific research, sea, stewardship, systematic exploration, technology, transformational research, undersea, underwater, Davisville, mapping survey, multibeam, multibeam backscatter, multibeam sonar, multi-beam sonar, noaa fleet, okeanos, okeanos explorer, R337, Rhode Island, scientific computing system, SCS, single beam sonar, singlebeam sonar, single-beam sonar, sub-bottom profile, water column backscatter, oceans, CAPSTONE, Wake Island, Prime Crust Zone, Pacific Seamounts, deep sea coral, bottom fish habitats, PRIMNM, Pacific Remote Islands Marine National Monument, Guam, Kwajalein, vulnerable marine habitats, seamounts, monument management, WWII submerged cultural heritage, World War II, benthic habitats, archaeological, archaeology, conservation, conserve, crm, cultural resource management, historic, marine archaeology, maritime, maritime archaeology, nautical, nautical archaeology, preserve, protect, protection, submerged cultural heritage, submerged cultural resource, uch, underwater cultural heritage

1.4 If this mission is part of a series of missions, what is the series name?

Okeanos ROV Cruises

1.5 Planned or actual temporal coverage of the data.

Dates: 7/27/2016 to 8/19/2016

1.6 Planned or actual geographic coverage of the data.

Okeanos Explorer (EX1606): CAPSTONE Wake Island Unit PRIMNM

Latitude Boundaries: 7.5 to 23

Longitude Boundaries: 142 to 171

1.7 What data types will you be creating or capturing and submitting for archive?

Cruise Plan, Cruise Summary, Data Management Plan, Highlight Images, Quick Look Report, CTD (raw), CTD (processed), Dive Summaries, EK60 Singlebeam Data, Expedition Cruise Report, Highlight Video, Images, Mapping Summary, Multibeam (image), Multibeam (processed), Multibeam (product), Multibeam (raw), NetCDF, Raw Video (digital), Salinity data, Sample Analysis Reports, SCS Output (compressed), SCS Output (native), Selected Raw Video, Temperature data, Water Column Backscatter, XBT (raw)

1.8 What platforms will be employed during this mission?

NOAA Ship Okeanos Explorer, Deep Discoverer ROV, SEIRIOS Camera Sled

2. Point of Contact for this Data Producing Project

Overall POC: Brian Kennedy
 Title: Expedition Coordinator
 Affiliation/Dept: Global Foundation for Ocean Exploration
 E-Mail: brian.kennedy@noaa.gov
 Phone: 706-540-2664

3. Point of Contact for Managing the Data

Data POC Name: Andy O'Brien, Joshua Carlson, Christopher Kelley, Susan Gottfried
 Title: Onboard Operational Data Management, Shoreside Data Management, Sampling Operations Data Management, Data Stewardship and Archive
 E-Mail: andrew.parson.obrien@gmail.com, joshocar@gmail.com, ckelly@hawaii.edu, susan.gottfried@noaa.gov

4. Resources

4.1 Have resources for management of these data been identified? True

4.2 Approximate percentage of the budget devoted to data management. (specify % or "unknown")
 unknown

5. Data Lineage and Quality

5.1 What is the processing workflow from collection to public release?

SCS data shall be delivered in its native format as well as an archive-ready, documented, and compressed NetCDF3 format to NCEI-MD; multibeam data and metadata will be compressed and delivered in a bagit format to NCEI-CO; video data shall be documented and archived in the NOAA CLASS system and the oceanographic archive; specimens shall be processed onboard the Okeanos Explorer in the WetLab and then delivered with documentation to repositories based upon their specimen type (Biological - Smithsonian, Geological - Oregon State University Marine Geological Laboratory, Genetic - Ocean Genomic Legacy)

Okeanos Explorer (EX1606): CAPSTONE Wake Island Unit PRIMNM

5.2 What quality control procedures will be employed?

Quality control procedures for the data from the Kongsberg EM302 is handled at UNH CCOM/JHC. Raw (level-0) bathymetry files are cleaned/edited into new data files (level-1) and converted to a variety of products (level-2). Data from sensors monitored through the SCS are archived in their native format and are not quality controlled. Data from CTD casts and XBT firings are archived in their native format. CTDs are post-processed by the data management team as a quality control measure and customized CTD profiles are generated for display on the Okeanos Atlas (explore.noaa.gov/okeanosatlas).

6. Data Documentation

6.1 Does the metadata comply with the Data Documentation Directive? True

6.1.1 If metadata are non-existent or non-compliant, please explain:

not applicable

6.2 Where will the metadata be hosted?

Organization: An ISO format collection-level metadata record will be generated during pre-cruise planning and published in an OER catalog and Web Accessible Folder (WAF) hosted at NCEI-MS for public discovery and access. The record will be harvested by data.gov.

URL: <http://www.ncddc.noaa.gov/oer-waf/ISO/Resolved/2016/>

Meta Std: ISO 19115-2 Geographic Information with Extensions for Imagery and Gridded Data will be the metadata standard employed; a NetCDF3 standard for oceanographic data will be employed for the SCS data; the Library of Congress standard, MACHine Readable Catalog (MARC), will be employed for NOAA Central Library records.

6.3 Process for producing and maintaining metadata:

Metadata will be generated via xml editors or metadata generation tools.

7. Data Access

7.1 Do the data comply with the Data Access Directive? True

7.1.1 If the data will not be available to the public, or with limitations, provide a valid reason.

Not Applicable

7.1.2 If there are limitations, describe how data are protected from unauthorized access.

Account access to mission systems are maintained and controlled by the Program. Data access prior to public accessibility is documented through the use of Data Request forms and standard operating procedures.

7.2 Name and URL of organization or facility providing data access.

Org: National Centers for Environmental Information

URL: <http://explore.noaa.gov/digitalatlas>

7.3 Approximate delay between data collection and dissemination. By what authority?

Hold Time: not applicable

Authority: not applicable

7.4 Prepare a Data Access Statement

Okeanos Explorer (EX1606): CAPSTONE Wake Island Unit PRIMNM

No data access constraints, unless data are protected under the National Historic Preservation Act of 1966.

8. Data Preservation and Protection

8.1 Actual or planned long-term data archive location:

Data from this mission will be preserved and stewarded through the NOAA National Centers for Environmental Information. Refer to the Okeanos Explorer FY16 Data Management Plan at NOAA's EDMC DMP Repository (EX_FY16_DMP_Final.pdf) for detailed descriptions of the processes, procedures, and partners involved in this collaborative effort.

8.2 If no archive planned, why?

not applicable

8.3 If any delay between data collection and submission to an archive facility, please explain.

30-90 days

8.4 How will data be protected from accidental or malicious modification or deletion?

Data management standard operating procedures minimizing accidental or malicious modification or deletion are in place aboard the Okeanos Explorer and will be enforced.

8.5 Prepare a Data Use Statement

Data use shall be credited to NOAA Office of Ocean Exploration and Research.

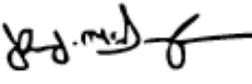
Appendix C: Categorical Exclusion



**UNITED STATES DEPARTMENT OF
COMMERCE**
National Oceanic and Atmospheric
Administration
OCEANIC AND ATMOSPHERIC RESEARCH
Office of Ocean Exploration and
Research Silver Spring, MD
20910

July 13, 2016

MEMORANDUM FOR: The Record

FROM: John McDonough 
Deputy Director, NOAA Office of Ocean
Exploration and Research (OER)

SUBJECT: Categorical Exclusion for NOAA Ship *Okeanos Explorer*
Cruise EX-16-06

NAO 216-6, Environmental Review Procedures, requires all proposed projects to be reviewed with respect to environmental consequences on the human environment. This memorandum addresses NOAA Ship *Okeanos Explorer*'s scientific sensors possible effect on the human environment.

This project is part of the NOAA Office of Ocean Exploration and Research's (OER) "Science Program" and entails ocean mapping activities, Remotely Operated Vehicle (ROV) Operations, and water column profiling using CTD casts designed to increase knowledge of the marine environment. This Categorical Exclusion addresses NOAA Ship *Okeanos Explorer* cruise EX-16-06 "CAPSTONE : *Deepwater Wonders of Wake: Exploring the Pacific Remote Islands Marine National Monument*" (ROV & Mapping)" led by Brian Kennedy, Expedition Coordinator for NOAA OER. This expedition serves as an opportunity for NOAA and the Nation to highlight the uniqueness and importance of the Pacific Monuments and Sanctuaries, which are national symbols of ocean conservation. Operations conducted during this expedition and the broader 3-year CAPSTONE campaign support NOAA missions to understand and predict changes in climate, weather, oceans and coasts, and share the knowledge and information with others. Much of this year's work will contribute to and complement NOAA's Deep Sea Coral Research and Technology Program's three-year Pacific Islands Regional Initiative.

EX-16-06 is a telepresence-enabled ROV cruise that will be conducted from July 27- August 19 2016 in Guam, on the High Seas, in the Wake Island unit of the Pacific Remote Islands Marine National Monument (PRIMNM), and the Marshall Islands. Operations will be focused primarily on deep water areas 500m and deeper (though may include high priority work up to 250m). The cruise will start in Guam and end in Kwajalein, Marshall Islands. A tandem 6,000 meter ROV system will be deployed and CTD rosette casts may be conducted during the expedition. ROV

dive targets include seamounts, rift zone ridges, and bottom fish habitats

The Kongsberg EM 302 multibeam (30 kHz), Kongsberg EK 60 split beam sonars (18, 38, 70, 120, 200 kHz), a Knudsen 3260 Sub-Bottom Profiler (3.5 kHz), and two Teledyne Acoustic Doppler Current Profilers (ADCP) operating at 38 kHz and 300 kHz will be operated during the project. Additionally, expendable bathythermographs (XBTs), UnderwayCTD casts, and CTD rosette casts will be conducted in conjunction with multibeam data collection. Mapping operations will be conducted primarily in the evening/overnight, and during transits in water deeper than 50 m. As the ship moves over the surface of the water during mapping operations, negative acoustic impacts from sonar operations on a single target are negligible.

ROV Operations

The purpose of conducting ROV operations is to conduct interdisciplinary site characterization at priority targets in the PRIMNM, on the high seas and in the Marshall Islands. Interdisciplinary site characterization would be achieved by visually surveying priority targets while simultaneously acquiring environmental data with in situ sensors mounted on the ROVs (CTD and DO). ROV targets include seamounts, rift zone ridges, and bottom fish habitats. The combined dives will enable scientists and managers to have a better understanding of the diversity and distribution of deep water habitats in these areas, and should contribute to enhanced protection of these resources.

The *Okeanos Explorer* is equipped with OER's dedicated, fully integrated, two-body ROV system. ROV operations are conducted primarily during daylight hours while the vessel is stopped and holds station using dynamic positioning. ROV operations will typically take place within several meters of the seafloor, and are conducted in a way to minimize seafloor disturbances. On occasion, the ROV is set down on the seafloor in order to acquire very close imagery of habitats or features of interest. Common procedure includes visually scanning the seafloor to ensure the area the ROV is set on does not include corals or other animals; however some animals may reside beneath the sediment or may be too small to see. The ROV also has a temperature probe that may be shallowly inserted into the seafloor sediment to measure the depth or temperature of features of interest. Finally, though every effort is made to prevent any unnecessary seafloor disturbance, it is likely that at some point the ROV will inadvertently touch some benthic fauna (e.g., sea whip) or that water moving through the ROV thrusters will stir up small amounts of seafloor sediment. Any disturbance would likely be similar to that seen during normal near bottom SCUBA dives. During EX1606, up to 17 deployments of the ROV would occur during the expedition, resulting in 170 hours total dive time (-8-12 hours for each dive). The ROV moves across the seafloor throughout the dive, so impact to any one area are short in duration and therefore minimal.

During these dives, limited sampling operations are planned to collect very selective specimens with the ROV that have the potential to contribute significant scientific discoveries. Biological specimen collections will focus on potential new species or new records for the region, and the dominant morphotype animal (such as a coral or sponge) in a habitat. When possible, only a sub-sample will be taken of biological specimens (e.g., only a piece or branch of corals and sponges will be collected, not the entire organism). Selective rock specimens, that have the potential to contribute significant scientific discoveries, as outlined in the expedition goals, will also be targeted. These are expected to include rocks from seamounts; manganese-coated rocks;

and rock samples in support of the United States Extended Continental Shelf Project. When possible, rock samples will be selected in a way to minimize disturbance to the surrounding environment and to minimize the take of attached organisms.

Mapping Operations on *Okeanos Explorer*

The acquisition of high-resolution seafloor mapping data is an essential precursor to making significant biological, geological, archaeological and oceanographic discoveries. The *Okeanos Explorer* cruise will collect seafloor mapping data to supplement previous work. These maps form the basis for selecting ROV dive targets. ROV cruises would take the next major step in baseline habitat characterization by using the ROV system to visually investigate unknown and little known deep water habitats identified as priority scientists and managers. CTD casts may be conducted to collect additional information about the physical and chemical properties of the water column, including at sites of interest identified from mapping and ROV investigation.

As is standard procedure on exploration cruises with this vessel, the ship will conduct sonar mapping operations at during non-ROV operations throughout the cruise. As the ship moves over the surface of the water during mapping operations, negative acoustic impacts from sonar operations on a single target are negligible. Acoustic instruments that will be operational during the project are a 30 kHz multibeam echosounder (Kongsberg EM 302), Kongsberg EK60 single beam echosounders (18, 38, 70, 120, 200, and 333 kHz), Teledyne Acoustic Doppler Current Profilers (38 and 300 kHz), and a 3.5 kHz sub-bottom profiler (Knudsen Chirp 3260). Additionally, expendable bathythermographs (XBTs) and the ship's UCTD will be deployed at regular intervals in association with multibeam data collection. All of these systems are routinely used by this exploration vessel and have provided invaluable scientific data for marine researchers and managers, including numerous National Marine Sanctuaries and Monuments, the Bureau of Ocean Energy Management and the U.S. Geological Survey.

Bridge Officers and Watch Standers will be on watch during all hours and will to look for marine mammals and other observable species potentially sensitive to the sound of the sonars. If cetaceans are sighted, knowledgeable personnel would follow established best management practices to minimize disturbance. If a cetacean is observed, the Mapping Watch Lead and Expedition Coordinator are notified, and if appropriate, the ship will slow down or stop until the animal has departed the area. If cetacean species are present within 400 m of the ship, the vessel will stop until the animals depart the area. When marine mammals are able to be identified by Bridge Officers or Watch Standers, these observations are noted in the NOAA fleet marine mammal observation log as part of standard practice.

Multibeam Sonar

Multibeam sonar data will produce high-resolution bathymetry and acoustic backscatter maps. These maps will provide critical baseline information to scientists and resource managers interested in identifying and expanding our understanding of the important biological habitats and ecological connections in the Monuments, and the geology of the area. Additionally, the data collected will help scientists better understand the size and character of seafloor habitats in the area, allowing for improved targeting of future exploration and research, including the selection of sites for further investigation with a ROV.

Sound velocity -Underway CTD or XBT

Accurate measurements of sound speed as a function of depth down to approximately 700 meters are needed every 3-6 hours during multibeam sonar mapping operations. These sound speed measurements are essential for ray-tracing calculations used by the EM302 multibeam sonar system in order to collect accurate bathymetry and backscatter data. To obtain these essential data, the Okeanos Explorer can either use an XBT or the new underway CTD (UCTD) equipped with a sound velocity probe. The Okeanos Explorer plans to use the UCTD during the 2016-17 field seasons as much as possible as rather than conducting XBTs, since UCTD does not leave anything in the ocean after gathering the measurements.

The UnderwayCTD (UCTD): The UCTD manufactured by Teledyne Ocean science is a piece of equipment used to gather conductivity/temperature/depth (CTD) measurements or sound velocity measurements while the ship is moving. This instrument is mounted on the stem railing and has a re-usable probe that is dropped through the water column then retrieved by rewinding the line onto a motorized spool. The unit would not touch the seafloor. The unit can be equipped with a CTD probe or a sound velocity probe. When equipped with the sound velocity probe, the UCTD can obtain water column profiles down to over 700 meters while the ship is moving at 8 knots, Okeanos Explorer's standard survey speed, so the UCTD can sample the water column while continuously mapping.

Expendable bathythermographs (XBT): XBTs are deployed to obtain sound velocity profiles. The profiles are required to calibrate the multi-beam system and ensure accurate bathymetric mapping. During the EX-16-06 ROV cruise, mapping operations would be conducted mainly at night in transit to the next dive location. XBTs will likely be deployed once every 4-6 hours to ensure accurate bathymetric data collection (resulting in a maximum of 2-3 total XBT deployments in a 24-hour period). It is anticipated that UCTD casts will be the preferred and more commonly used method to obtain sound velocity profile data, however XBTs will likely be used when time to obtain the cast data is very limited (e.g. weather windows, vessel traffic, or ship-time constraints) or there is a mechanical or data quality problem with the UCTD. The very fine wire connecting the XBT probe to the ship is extremely easy to break by hand once the probe reaches maximum depth. The minimal tensile strength of the wire should represent a minimal entanglement risk for marine animals. The expended materials are unlikely to result either in any significant environmental impacts to the sea floor or in a significant degradation of marine water quality. Over a period of years, these materials would degrade, corrode, and become incorporated into the sediments.

Single Beam and Split Beam Sonars

Kongsberg EK60 sonars are specifically designed to provide calibrated quantitative acoustic data useful for interpreting marine life in the water column of the ocean. Additionally, they are now also used to generate gaseous seep flux rates and their contribution to ocean and atmospheric chemistry. In many cases the ability to observe and measure the acoustic backscatter response of different types of marine life (fish, squid, plankton, etc.) is dependent upon the frequency of the sonar. Therefore, the more frequencies that are used for these acoustic surveys, the more complete the picture that can be gained about the marine environment. OER has received specific feedback from marine scientists in the Pacific region that our EK60 data would be much more useful when collected using multiple frequencies than at just the 18 kHz frequency. Given these benefits, OER intends to gather EK60 data at multiple frequencies as much as possible.

Acoustic Doppler Current Profilers (ADCPs)

Ship-mounted ADCPs have been used on oceanographic research vessels for over 25 years, and are useful for characterizing current speeds and direction at various depths in the ocean. ADCP measurements are therefore critically useful in characterizing the physical oceanography of an area, identifying small to mesoscale ocean current features, and even contributing to our understanding of the climatology of a region with repeated measurements over time. In addition to these scientific benefits, the Okeanos Explorer is interested in using the new ADCPs to assess currents near ROV dive locations to inform dive planning and ensure safe ROV deployment and recovery operations. Given these benefits, OER would like to use the new ADCPs within the PRIMNM, within the Marshall Islands and on the High Seas as a useful data stream contributing to characterizing the area, providing new information on ocean currents to scientists and managers, and helping to plan effective and safe ROV exploration dives.

Sub Bottom Profiler

The primary purpose of this Knudsen Chirp 3260 (3.5 kHz) sonar is to provide echogram images of surficial geological sediment layers underneath the seafloor to a maximum depth of about 80 meters below the seafloor. The Sub Bottom Profiler is normally operated to provide information about the sedimentary features and the bottom topography that is simultaneously being mapped by the multibeam sonar. The data generated by this sonar is fundamental in helping geologists interpret the shallow geology of the seafloor. Collecting this data in the Leg II operating area will provide greatly improved insights into the geology of the region, and supplement existing magnetometer and gravity measurements obtained by other vessels.

CTD Rosette Operations

The CTD rosette instrument is used to obtain conductivity, temperature, depth and other oceanographic data (dissolved oxygen, light scattering, and oxygen reduction potential). The system would be lowered to a maximum depth of 6800 m by an embedded scientific winch and wire while the vessel would be stopped and hold station using dynamic positioning. The average time to conduct a CTD casts varies from one to several hours depending on water depth (the CTD is lowered through the water column at 60m/min). CTD casts would be conducted at selected sites including locations where ROV dives are conducted to allow for an improved understanding of the environmental conditions by measuring the physical or chemical properties of the water column overlying or hosting a particular habitat. The CTD would not touch the seafloor and would have limited time and presence in the marine environment.

Permits

OER has completed an informal consultation with NOAA's National Marine Fisheries Service (NMFS) under section 7 of the Endangered Species Act of 1973 that addresses the potential impacts of project activities to ESA-listed species and critical habitat for all operations to be conducted as part of the 2016-2017 CAPSTONE expeditions. A Letter of Concurrence was received from NMFS on February 7, 2016, concurring with OER's determination that CAPSTONE Expedition activities are not likely to adversely affect ESA-listed marine species, and would have insignificant effects on designated or proposed critical habitat.

Effects of the Project

As expected for ocean research with limited duration or presence in the marine environment,

this project will not have the potential for significant impacts. Additionally, informal consultation was initiated under Section 7 of the Endangered Species Act (ESA), requesting NOAA Fisheries' Protected Resources Division concurrence with our biological evaluation determining that this expedition and all other planned *Okeanos Explorer* operations during the 2016-17 field season, may affect, but are not likely to adversely affect, ESA-listed marine species. The informal consultation was completed on February 3, 2016 when NOAA OER received a signed letter from the Regional Administrator of NMFS Pacific Islands Regional Office, stating that NMFS concurs with OER's determination that conducting proposed *Okeanos Explorer* cruises are not likely to adversely affect ESA-listed marine species.

Knowledgeable experts who are aware of the sensitivities of the marine environment will conduct the at-sea portions of this project, and will adhere to standard operating procedures as defined above and make every effort to minimize negative impacts to the environment. The potential gains or beneficial effects of the project seem to outweigh any potential adverse effects. This expedition will provide baseline characterization of poorly understood deep water habitats, including within marine protected areas, contained within the U.S. Exclusive Economic Zone (EEZ) and on the high seas. This work will provide essential information for further research, exploration, and conservation of marine habitats within the planned operating area.

As defined in Sections 5.05 and 6.03.c.3 (a) of NAO 216-6, this is a research project of limited size or magnitude and will not result in individually or cumulatively significant impacts on the quality of the human environment. Specifically, this research cruise would have only short-term effects with the principle goals of natural resource inventories and environmental monitoring over a wide geographic area. Furthermore, this action would not be subject to any of the exceptions for categorical exclusion provided at NAO 216-6 section 5.05c. As such, this project is categorically excluded from the need to prepare a NEPA environmental assessment.

Appendix D: ESA Section 7 Initiation Letter, Biological Evaluation and Letter of Concurrence



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Pacific Islands Regional Office
1845 Wasp Blvd., Bldg 176
Honolulu, Hawaii 96818
(808) 725-5000 • Fax: (808) 725-5215

Mr. John McDonough
Deputy Director
NOAA Office of Ocean Exploration and Research

Dear Mr. McDonough:

This letter responds to your January 14, 2016 Request for Consultation by the Office of Exploration and Research (OER) regarding efforts aboard the NOAA vessel *Okeanos Explorer* with the proposed action consisting of activities to explore and improve understanding of the distribution and diversity of deep water habitats in the Pacific, and in particular in the Marine National Monuments. You have requested our concurrence under Section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. §1531 et seq.), with your determination that the proposed action may affect but is not likely to adversely affect green, hawksbill, leatherback, olive ridley, and north Pacific loggerhead sea turtles; Main Hawaiian Islands false killer whale distinct population segment, humpback whales, blue whales, fin whales, sei whales, sperm whales, north Pacific right whales, the Indo-West Pacific and Central Pacific distinct population segment of the scalloped hammerhead shark, Hawaiian monk seals; and the coral species *Acropora globiceps*, *A. jacquelineae*, *A. retusa*, *A. speciosa*, *Euphyllia paradivisa*, *Isopora crateriformis*, and *Seriatopora aculeata*.

Proposed Action/Action Area: The proposed activity is more fully described in your request for consultation and the associated biological evaluation (CAPSTONE 2016). The proposed action (Okeanos Explorer cruises) includes the use of various ship and submersible-deployed electronic systems to collect data on the distribution and diversity of deep water habitats in the Marine National Monuments. The activity would occur during two years with up to 20 research cruises scheduled between February 2016 and December 2017. The expedition teams (26 crew and up to 20 rotating scientists and/or technicians on each cruise leg) would be authorized to conduct mapping and Remotely Operated Vehicle (ROV) surveys using the Okeanos Explorer's multibeam, split beam, subbottom profiler and acoustic Doppler current profiler (ADCP) sonar systems, utilizing the ship's conductivity-temperature-depth (CTD) sampling rosette for various water measurements and deploying an ROV. No activities are scheduled to occur on land.

The suite of sonars aboard the vessel includes a Kongsberg EM302 30 kHz multibeam system, which collect bathymetry and backscatter data; several Simrad EK 60 split-beam sonars that



range from 18 to 333 kHz which are designed to gather measurements of biological and gaseous targets in the water column; and a Knudsen 3.5 kHz chirp sub-bottom profiler. The 300 kHz and 38 kHz ADCPs provide information about current velocity and direction at various depths. Sonar mapping activities will be conducted throughout the proposed action area and during transits to and from sites where operations will be conducted in an effort to fill in gaps in data knowledge and to build on data already collected. The maps generated from these activities will improve understanding of the geology and important biological habitats in the project area.

Conductivity, temperature and depth data will be collected by both an Underway CTD and a CTD rosette instrument. The CTD rosette, which is deployed while the ship is stopped and holding dynamic position, is lowered by a winch and wire to a maximum depth of 6800 m to collect water samples through 24 2.5 L niskin bottles. The CTD rosette will be deployed at select sites where ROV operations are conducted to allow for an improved understanding of the environmental conditions at that particular site. The deployment and retrieval of the CTD rosette takes up to several hours (depending on depth), while the Underway CTD can be deployed while the ship is moving, saving hours of time and fuel. The instrument is mounted on the stern railing and outfitted with a re-useable probe that is deployed and retrieved through the use of motorized spool. The Underway CTD will be used to collect water column profiles to a maximum depth of 700 m.

ROV operations will be designed to provide interdisciplinary site characterization at priority targets in and around monuments, sanctuaries and protected areas, through visual observation of priority targets while acquiring environmental data with onboard sensors. Sampling will be focused on corals and sponges, but will target specimens believed to be new species or new records for an area. No ESA-listed corals would be sampled. As many as 200 deployments of the ROV may occur during the 2016 – 17 field season resulting in 1600 hours of total dive time. The dives will better enable scientists and managers to understand the diversity and distribution of deep water habitats.

The action area covered by the accompanying biological evaluation encompasses the marine environments of Papahānaumokuākea Marine National Monument (PMNM); Oahu and the big island of Hawai'i; the area south and west of Molokai, Lana'i, and Kaho'olawe, the Geologists Seamounts located about 100 nm south of Honolulu; the Musicians Seamounts located about 150 nm NNE of Nihoa Island; all of the Pacific Remote Island Areas composing the Pacific Remote Islands Marine National Monument (PRIMNM); the Commonwealth of the Northern Marianas Islands (CNMI) and the Marianas Trench Marine National Monument (MTMNM); the vicinity of American Samoa and the National Marine Sanctuary of American Samoa (NMSAS); the Rose Atoll Marine National Monument (RAMNM); and the vessel transit areas between Honolulu, Hawai'i, Guam, Saipan, Kwajalein, Pago Pago where ESA-listed marine species or their habitats may be impacted by the proposed activities.

Species That May Be Affected: OER determined that the proposed action may affect but is not likely to adversely affect green sea turtles (*Chelonia mydas*), hawksbill sea turtles (*Eretmochelys imbricata*), North Pacific distinct population segment of loggerhead sea turtles (*Caretta caretta*),

olive ridley sea turtles (*Lepidochelys olivacea*), leatherback sea turtles (*Dermochelys coriacea*), Main Hawaiian Islands false killer whale distinct population segment (*Pseudorca crassidens*), humpback whales (*Megaptera novaeangliae*), sperm whales (*Physeter macrocephalus*), fin whales (*Balaenoptera physalus*), blue whales (*Balaenoptera musculus*), sei whales (*Balaenoptera borealis*), north pacific right whales (*Eubalaena japonica*), the Indo-West Pacific and Central Pacific distinct population segments of the scalloped hammerhead shark (*Sphyrna lewini*), Hawaiian monk seals (*Neomonachus schauinslandi*), Hawaiian monk seal critical habitat and the coral species *Acropora globiceps*, *A. jacquelineae*, *A. retusa*, *A. speciosa*, *Euphyllia paradivisa*, *Isopora crateriformis*, and *Seriatopora aculeata*. Detailed information about the biology, habitat, and conservation status of sea turtles can be found in their recovery plans and other sources at <http://www.nmfs.noaa.gov/pr/species/turtles/>. The same can be found for Hawaiian monk seals and cetaceans at <http://www.nmfs.noaa.gov/pr/species/mammals/>; and more information on listed corals can be found at http://www.fpir.noaa.gov/PRD/prd_coral.html.

Critical Habitat: The proposed action would take place within designated monk seal critical habitat. Critical habitat was designated under the ESA for the Hawaiian monk seal on April 30, 1986 and revised on May 26, 1988 (53 FR 18988) and again on August 21, 2015 (80 FR 50926). Designated critical habitat includes all beach areas, lagoon waters, and ocean waters out to a depth of 200 m around Kure Atoll; Midway Islands (except Sand Island), Pearl and Hermes Reef, Lisianski Island, Laysan Island, Gardner Pinnacles, French Frigate Shoals, Necker Island, Maro Reef, and Nihoa Island, and includes the seafloor and all subsurface waters and habitat within 10 meters of the seafloor. Around the Main Hawaiian Islands, critical habitat extends in designated areas from the beach out to the 200 meter depth contour, and includes the seafloor and subsurface waters within 10 meters of the seafloor.

Analysis of Effects: In order to determine that a proposed action is not likely to adversely affect listed species, NMFS must find that the effects of the proposed action are expected to be insignificant, discountable, or beneficial as defined in the joint USFWS-NMFS Endangered Species Consultation Handbook: (1) insignificant effects relate to the size of the impact and should never reach the scale where take occurs; (2) discountable effects are those that are extremely unlikely to occur; and (3) beneficial effects are positive effects without any adverse effects (USFWS & NMFS 1998). This standard, as well as consideration of the probable duration, frequency, and severity of potential interactions, was applied during the analysis of effects of the proposed action on ESA-listed marine species, as is described in detail in the OER consultation request. The OER determined that the risk of collisions with vessels and the risk of entanglement would be discountable; and that the risk from exposure to elevated noise level, disturbance from human activity, as well as exposure to wastes and discharges would result in insignificant effects on ESA-listed sea turtles, marine mammals, sharks and corals; and that the potential effects of the proposed action to designated or proposed critical habitat would also be insignificant.

Considering the information and assessments presented in the OER consultation request, and in the best scientific information available about the biology and expected behaviors of the ESA-listed marine species considered in this consultation; NMFS agrees that: 1) the list of ESA-listed species and critical habitats potentially exposed to the effects of the action is correct, 2) the suite

of identified stressors is comprehensive, and 3) the assessment of exposure risk and significance of exposure to those stressors is accurate. Therefore, NMFS agrees that:

- the risk of collisions with vessels for marine mammals, turtles, sharks and the listed coral species in the action area is discountable;
- the risk of entanglement with marine mammals, sea turtles and sharks is discountable; and,
- ESA-listed species in the action area are unlikely to respond to anticipated elevated noise levels, disturbance from human activity, and exposure to wastes and discharges. Further, if any response were to occur, it would be temporary in nature and never reach the scale where it would affect the individual's health, and as such, have insignificant effects.

Conclusion: NMFS concurs with your determination that conducting the proposed Okeanos Explorer cruises are not likely to adversely affect ESA-listed marine species. This concludes your consultation responsibilities under the ESA for species under NMFS's jurisdiction. However, this consultation focused solely on compliance with the ESA. Additional compliance review that may be required of NMFS for this action (such as assessing impacts on Essential Fish Habitat) would be completed by NMFS Habitat Conservation Division in separate communication, if applicable.

ESA Consultation must be reinitiated if: 1) a take occurs; 2) new information reveals effects of the action that may affect listed species or designated critical habitat in a manner or to an extent not previously considered; 3) the identified action is subsequently modified in a manner causing effects to listed species or designated critical habitat not previously considered; or 4) a new species is listed or critical habitat designated that may be affected by the identified action.

If you have further questions please contact Richard Hall on my staff at (808) 725-5018. Thank you for working with NMFS to protect our nation's living marine resources.

Sincerely,



Michael D. Tosatto
Regional Administrator

cc: Justin Rivera, Papahānaumokuākea Marine National Monument
Aaron Nadig, ESA Section 7 Program, USFWS, Honolulu

NMFS File No.: PIR-2016-9774
PIRO Reference No.: I-PI-16-1347-AG

Literature Cited

Campaign to Address Pacific Monument Science, Technology and ocean Needs (CAPSTONE) 2016. Request for Informal Consultation. Letter from John McDonough to Ann Garrett dated January 14, 2016 and attachments.

U.S. Fish and Wildlife Service and National Marine Fisheries Service. 1998. Endangered Species Consultation Handbook. Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act.
http://www.nmfs.noaa.gov/pr/pdfs/laws/esa_section7_handbook.pdf



January 14, 2016

Ann Garrett
Assistant Regional Administrator
Protected Resources Division
NMFS Pacific Islands Regional Office
1845 Wasp Blvd., Building 176
Honolulu, HI 96818

Re: Request to Initiate Consultation under Section 7 of the Endangered Species Act for the Campaign to Address Pacific Monument Science, Technology and Ocean Needs (CAPSTONE Project)

Dear Ms. Garrett:

Operating under a partnership with NOAA's Office of Ocean Exploration and Research and the Office of Marine and Aviation Operations, the *Okeanos Explorer* team is preparing to continue the CAPSTONE campaign into the Central and Western Pacific during the 2016 and 2017 field seasons. The action area for the 2016 – 2017 season will include the marine environments in and around: the Papahānaumokuākea Marine National Monument (PMNM); Oahu and the big island of Hawai'i; the area south and west of Molokai, Lana'i, and Kaho'olawe, the Geologists Seamounts located about 100 nm south of Honolulu; the Musicians Seamounts located about 150 nm NNE of Nihoa Island; all of the Pacific Remote Island Areas composing the Pacific Remote Islands Marine National Monument (PRIMNM); the Commonwealth of the Northern Marianas Islands (CNMI) and the Marianas Trench Marine National Monument (MTMNM); the vicinity of American Samoa and the National Marine Sanctuary of American Samoa (NMSAS); the Rose Atoll Marine National Monument (RAMNM); and the vessel transit areas between Honolulu, Hawai'i, Guam, Saipan, Kwajalein, Pago Pago.

The activity would occur during two years and could include up to twenty different research cruises aboard the NOAA Ship *Okeanos Explorer* scheduled between February 2016 and December 2017. All cruises will focus on collecting critical baseline information in monuments and sanctuaries to meet NOAA science and management needs. The overarching goal of the project is to extend and improve the understanding of the distribution and diversity of deep-water habitats within the marine protected areas in the Pacific. Data and information from the cruises will build on previous work where appropriate, and provide a foundation of publicly-accessible baseline information to improve management and spur further exploration and research. Like previous expeditions in the Gulf of Mexico, western Atlantic, Indonesia, and Hawaii, NOAA



will work with the scientific community and public to characterize unknown and poorly-known areas through telepresence-based exploration. Operations will use the ship's deep water mapping systems, NOAA's 6000m remotely operated vehicles (ROV), CTD rosette, and a high-bandwidth satellite connection for real-time ship to shore communications. These expeditions will help establish a baseline of information in the region to catalyze further exploration, research and management activities.

We propose to conduct activities to explore and improve understanding of the distribution and diversity of deep water habitats. No activities would occur on land. The expedition teams (26 crew and up to 20 rotating scientists/technicians on each cruise leg) would be authorized to conduct mapping and ROV surveys using the *Okeanos Explorer's* multibeam, split beam, subbottom profiler and acoustic Doppler current profiler (ADCP) sonar systems, utilizing the ship's conductivity-temperature-depth (CTD) sampling rosette for various water measurements and deploying an ROV.

Enclosed is a Biological Evaluation (BE) to initiate consultation under Section 7(a)(2) of the Endangered Species Act (ESA). As described in the BE, we have determined that the proposed 2016 CAPSTONE cruises may affect, but are not likely to adversely affect, the following ESA-listed marine species: green sea turtles (*Chelonia mydas*), hawksbill sea turtles (*Eretmochelys imbricata*), North Pacific distinct population segment of loggerhead sea turtles (*Caretta caretta*), olive ridley sea turtles (*Lepidochelys olivacea*), leatherback sea turtles (*Dermochelys coriacea*), Main Hawaiian Islands false killer whale distinct population segment (*Pseudorca crassidens*), humpback whales (*Megaptera novaeangliae*), sperm whales (*Physeter macrocephalus*), fin whales (*Balaenoptera physalus*), blue whales (*Balaenoptera musculus*), sei whales (*Balaenoptera borealis*), north pacific right whales (*Eubalaena japonica*), the Indo-West Pacific and Central Pacific distinct population segments of the scalloped hammerhead shark (*Sphyrna lewini*), Hawaiian monk seals (*Neomonachus schauinslandi*), Hawaiian monk seal critical habitat; and the coral species *Acropora globiceps*, *A. jacquelineae*, *A. retusa*, *A. speciosa*, *Euphyllia paradivisa*, *Isopora crateriformis*, and *Seriatopora aculeata*.

We request your concurrence with our 'not likely to adversely affect' determination for the species listed above and for Hawaiian monk seal critical habitat.

Please contact Kelley Elliott (Kelley.Elliott@noaa.gov, 301-734-1024) with questions regarding this consultation request.

Respectfully,


For John McLaughlin

Appendix E: NASA Maritime Aerosols Network Survey of Opportunity

Survey or Project Name

Maritime Aerosol Network

Points of Contact (POC)

<i>Lead POC or Principle Investigator (PI & Affiliation)</i>	<i>Supporting Team Members ashore</i>
POC: Dr. Alexander Smirnov	<i>Supporting Team Members aboard (if required)</i>

Activities Description(s)*(Include goals, objectives and tasks)*

The Maritime Aerosol Network (MAN) component of AERONET provides ship-borne aerosol optical depth measurements from the Microtops II sun photometers. These data provide an alternative to observations from islands as well as establish validation points for satellite and aerosol transport models. Since 2004, these instruments have been deployed periodically on ships of opportunity and research vessels to monitor aerosol properties over the World Oceans.

Appendix F: Permit to Collect Data in the Marshall Islands



REPUBLIC OF THE MARSHALL ISLANDS
MINISTRY OF FOREIGN AFFAIRS
P.O. BOX 1349
MAJURO, MARSHALL ISLANDS 96960

US/98-15

The Ministry of Foreign Affairs of the Republic of the Marshall Islands presents its compliments to the Embassy of the United States of America and has the honor to make reference to U.S. **Diplomatic Note No.15-105** regarding request for an authorization for NOAA Chief of Scientist Jeremy Potter to conduct marine scientific research in area requiring the consent from the RMI Government. It is in this regard that the Ministry has the further honor to inform the Embassy that in compliance with the requirements of the MIMRA Act 1997, NOAA Research Vessel, "Okeanos Explorer", has been granted permission, on the condition that a copy of report of all data and other information from the research vessel in RMI WATERS be forwarded to the Ministry of Foreign Affairs and the Marshall Islands Resource Authority.

The Ministry has the further honor to advise that authorization is granted pursuant with the understanding that the said vessel, captain and crew will comply with all RMI laws and regulations, and in particular the Marine Water Quality (1992) regulations, Solid Waste (1989) regulations, and Toilet Facilities and Sewage Disposal (1990) regulations, copies of which are available for download at the RMI-EPA website <http://rmiepa.org>.

Furthermore, the Ministry wishes to forward herein, RMI's nominees from Marshall Islands Marine Resources Authority to participate in afore-named research.

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Appendix

The Ministry of Foreign Affairs of the Republic of the Marshall Islands avails itself of this opportunity to renew to the Embassy of the United States of America the assurance of its highest consideration.



**Embassy of the United States of America
Majuro, REPUBLIC OF THE MARSHALL ISLANDS**

Appendix G: Submerged Cultural Heritage SOP

NOAA Office of Ocean Exploration Operational Policy and Procedures for Underwater Cultural Heritage Missions Conducted onboard the NOAA Ship *Okeanos Explorer*

IV. Purpose

The purpose of this document is to provide guidance for OER mission activities conducted aboard the NOAA Ship Okeanos Explorer, when such mission activities involve either unexpected discovery or targeted exploration of potential Underwater Cultural Heritage sites.

II. Background

Since the inception of NOAA's ocean exploration program in 2000, OER data management practices have been guided by the 2000 President's Panel Report recommendations, which prioritized rapid and unrestricted data sharing as one of five critical exploration program components. More recently Public law 111-11 [Section XII Subtitle A Part 1 Exploration] reinforced and expanded OER data management objectives, continuing to stress the importance of sharing unique exploration data and information to improve public understanding of the oceans, and for research and management purposes.

OER missions conducted aboard the NOAA Ship Okeanos Explorer offer a 'best-case' scenario for meeting Program mission objectives related to data sharing:

- Dedicated shipboard and shore-side teams work in tandem to ensure near-real time data product generation from shipboard and ROV sensors;
- Telepresence is used to share data products and information in real-time with shore-side participants and the public;
- Mission information is publically communicated in real time via Internet access to streamed video and related resources; and
- Data are managed throughout the lifecycle in accordance with all applicable policy directives and community best practices.

The nature of exploration defines the possibility of discovery, including unexpectedly exposing the location of underwater cultural resources; on some occasions, exploration targets are specifically focused on the exploration of suspected underwater cultural heritage (UCH) sites.

The need to protect the location of suspected UCH sites until they are fully understood, whether purposefully explored or fortuitously discovered, is an important statutory responsibility. In the case of OER expeditions aboard the Okeanos Explorer, a range of

operational procedures must be modified to ensure this protection occurs to the fullest extent possible. The following sections of this document define the methods for ensuring protection of these sensitive data throughout the data lifecycle.

III. Authority

- a. **Marine Archaeology:** This document is informed by: the Federal archaeology program; U.S. legislation on the treatment of cultural remains; and the UNESCO Convention for the Protection of the Underwater Cultural Heritage.

The NOAA Office of Ocean Exploration and Research (OER) supports the standards for conducting marine archaeological activities enumerated in the Annex Rules of the UNESCO Convention on the Protection of the Underwater Cultural Heritage. Preservation and protection of prehistoric and historic cultural resources is the policy of the Federal government and OER has a responsibility to consider the effects of its activities on these resources. If data is found to be sensitive because it reveals the location of a historically significant cultural resource, Section 304 of the National Historic Preservation Act provides that the head of a Federal agency or other public official shall withhold from public disclosure information about the location, character, or ownership of a historic property when disclosure may: cause a significant invasion of privacy; risk harm to the historic property; or impede the use of a traditional religious site by practitioners. This document will use the term Underwater Cultural Heritage, or UCH, to refer to historic and prehistoric traces of human existence that are totally or partially underwater.

- b. **Data Management:** Geospatial data are considered a national capital asset. National policy and international standards guide data management best practices to ensure timely and broad public accessibility to these data. Within NOAA, data management practices are informed by NOAA Administrative Order (NAO) 212-15 Management of Environmental Data and Information, which states in part:

Environmental data will be visible, accessible and independently understandable to users, except where limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements.

Sensitive UCH data collections require special handling while determinations are made as to whether each location will be nominated and will qualify for protection under the NHPA Section 304. OER considers these data to fall within the scope of the NAO 212-15 exceptions during this period.

IV. Roles and Responsibilities

Particular to the NOAA Ship *Okeanos Explorer*, there are many methods employed to ensure rapid and broad data access. When the goal is to restrict access to precise positional

information, several operational scenarios must be considered. Alternate operating procedures are then developed for:

- Real time operations:
 - Routine data transmissions and events that broadcast the ship position
 - Seafloor mapping operations and data production
 - Telepresence-enabled ROV operations
 - Video annotations and production
 - Pubic broadcast operations via website and maps
- Post-cruise data management

This table summarizes the roles and responsibilities of each Team Lead in implementing the policy through the management approaches described herein and the SOPs as defined in the Appendices.

MISSION PERSONNEL (Coordinated by: Expedition Coordinator)	
Responsible Team	Accountable for these (primary) actions
Expedition Coordinator	Notification of NDA to Mission Personnel ID , communicate and enforce UCH buffer zone Coordinate with Team leads and key personnel / ensure SOP compliance
Seafloor Mapping Team	Segregate raw and processed data into marked files so that restricted data are held separately and are clearly marked
Telepresence Team	Ensure broadcast data is free of any positional information
Video Team	Ensure UCH Dives and dive products are annotated as such; ensure all raw data and products are not geo-referenced
Data Management Team	Ensure all UCH data are appropriately segregated and documented. Follow post cruise and archive procedures as specified.
Communications Team	Ensure all communications are controlled through one primary POC; ensure communications are not geo-referenced.
<i>Okeanos Explorer</i> Operations (Coordinated by: CO or Designee)	
OMAO Operations	Notification to crew of NDA responsibilities Stop SCS events (email notifications) upon entering buffer zone; Start SCS events (email notifications) upon exiting buffer zone

V. Appendices: Standard Operating Procedures

Appendix A: MAPPING OPERATIONS

The following outlines the process for pre-cruise planning, mapping field operations, post-cruise follow up, and data archival procedures for the following scenarios:

- When UCH is unexpectedly discovered on a standard, non-UCH targeted mapping cruise
- When a cruise is specifically targeted at UCH.
- When an Isolated UCH survey is conducted as part of a broader cruise
- Large survey over UCH area with potential to contain multiple instances of UCH

A. Pre-Cruise Planning

1. Standard Mapping Pre-Cruise Planning

- a.** This section does not affect normal pre-cruise or data management processes for standard mapping cruises that are not conducting targeted UCH mapping. During pre-cruise planning the EX Cruise Coordinator is advised to consult with the OER Marine Archaeologist to discuss possible UCH targets in the mission area. The mapping team may be requested to optimize line planning as necessary to detect UCH and to process data, when possible, to a smaller non-standard grid size to create higher resolution mapping products to provide better images of potential UCH. If so, follow guidance in the UCH Mapping Pre-Cruise Planning section below.

2. UCH Mapping Pre-Cruise Planning

- a.** Background information - The EX mapping team should be supplied with information about targets in the survey area that will help in their detection and identification. This information will be supplied by OER's marine archaeologist and collaborating archaeologists.
- b.** Data processing and data products - Archaeologists involved with the survey will consult with the mapping team to discuss data processing and data products that will increase the potential to discover UCH. The cruise coordinator and mapping team lead will work with OER's marine archaeologist to coordinate this activity.
- c.** Consultation and data sensitivities - Cruise planning must also include a discussion on data sensitivity and data management/archiving. It is the appropriate time to collaborate with other Federal and state agencies that may have a legal or management interest in potential UCH in the survey area. The risks to the resources should be weighed to inform a post-cruise decision on whether or not UCH with potential historical or cultural significance should have information about their location restricted from public release. This should be a collaborative discussion that includes OER's marine archaeologist, cruise coordinator and cruise data manager along with cultural

resource managers and archaeologists from other agencies with an interest in the UCH. Agencies that may have an interest include the Office of National Marine Sanctuaries (ONMS) Maritime Heritage Program, Bureau of Ocean Energy Management, Bureau of Safety and Environmental Enforcement, U.S. Navy History and Heritage Command, National Park Service, State Historic Preservation Officers, and others. While planning expeditions in any foreign country the host government should be made aware of the potential to discover UCH.

- d.** In survey areas where an agency has responsibility for UCH, the data management team should carry out a consultation process with the agency to identify any special protocols that should be put in place to conform with the policies of the agency and these should be incorporated into the data management plan. The expedition coordinator is responsible for the overall execution of the data management plan.
- e.** On mapping missions within the National Marine Sanctuary System, pre-cruise discussions between the EX Cruise Coordinator and ONMS should include the ONMS Director of the Maritime Heritage Program (MHP) and the maritime heritage coordinator at the sanctuary site. They will help determine the sensitivity of data and data products.

B. Mapping Field Operations

1. Standard Mapping Field Operations

- a.** While standard mapping field operations are not affected by the marine archaeology SOP, any features which appear to be of cultural or historical significance, and appear anthropogenic in origin, do require special consideration. Cultural features include wrecks of ships or aircraft, the recognizable debris from wrecks, evidence of previous human settlements, or other items which may appear anthropogenic in origin and have some associated cultural or historical significance.
- b.** The EX Cruise Coordinator will consult with OER's marine archaeologist immediately on the discovery of UCH in the field. The Cruise Coordinator should provide an image and location information by email. The OER marine archaeologist may request special data products that have higher resolutions than standard data products to aid in characterizing UCH.
- c.** If UCH is determined not to be historically or culturally significant or it is determined that no harm will result by disclosing position information, no change to standard mapping field procedures is required.
- d.** If UCH is historically significant or potential to be historically significant, data and data products should be held from public release until reviewed for sensitivity as applicable under the National Historic Preservation Act and other pertinent legislation and regulations, prior to releasing data to a public archive.
- e.** The expedition coordinator is responsible for the overall execution of the data management plan.

- f.** When appropriate, OER’s marine archaeologist will contact relevant entities to notify them of the discovery and consult with them regarding the significance of the UCH.

2. UCH Targeted Mapping Field Operations

- a.** No informal information about UCH should be released to the general public by the ship or personnel. This includes posting information and images on social networking sites like Facebook, Twitter or personal blogs. Mapping data will be released to the public following the normal process and announcement of discoveries will be made through the appropriate offices and public affairs officials.
- b.** A five-mile buffer zone shall be created around the UCH isolated survey box. The following steps will be taken just prior to entering the buffer zone in order to stop broadcasting the ship’s location while the survey is conducted:
 - i. NOAA Shiptracker: Disable the SCS feed from the ship going to Shiptracker
 - ii. Automated Information System (AIS): NOAA requires that the AIS feed which broadcasts information about the ship, including position, course and speed, must remain on at all times for collision avoidance and other safety reasons. Although the [International Maritime Organization](#)'s (IMO) Maritime Safety Committee condemns the Internet publication of AIS data, it is easily available for viewing. During the cruise planning phase the Expedition Coordinator will provide the AIS broadcast range on the EX to the chief scientist and science team. The Chief scientist, the science team, or other parties involved in a UCH mapping cruise should be made aware of this and decide whether the value of the operation merits acceptance of the potential issues/outcomes imposed.
 - iii. Telepresence Video Feeds: Do not stream any feeds that include a visible ship location, for example the multi-beam acquisition screen does not high enough resolution over the video feed to see ship position. Streams include but not limited to the SCS data screen, or any active mapping data acquisition screens, or video feeds. It is acceptable to stream video feeds that do not include the ship’s location.
 - iv. The Cruise Coordinator will ensure the survey department takes steps to distinguish and separate UCH mapping data from non-UCH mapping data as appropriate.
 - v. Raw Multibeam Data Acquisition: Raw data will be logged in the standard folder structure on the multibeam acquisition computer. Raw data will be copied into a “Restricted” folder in the RAW data network folder structure. Data acquisition and processing logs will clearly state which files are restricted.
 - vi. Multibeam Data Field Processing: Restricted files will be processed and

gridded separately from other non-restricted data and will be clearly labeled as such in projects and filenames. The products will be created according to normal field quality-control procedures, but will not be sent to shore with the daily products, in order to not become publicly available via normal channels (FTP / Digital Atlas).

- vii. Raw EK 60 and Subbottom Data Acquisition: Raw data will be logged in the standard folder structure on the acquisition computers. Raw data will be copied into a 'Restricted' folder on the RAW and CRUISE DATA data network folder structure. Data acquisition and processing logs will clearly state which files are restricted.
 - viii. Cruise Data Transfer (EX to UNH) Package: In the Cruise Data Package carried from the ship by the Mapping Team Lead, a "Restricted" top-level directory will be added in the cruise data folder. Within the "Restricted" folder the same directory structure as the unrestricted folder will be repeated (i.e. SCS, CTD, Multibeam, Imagery, etc).
 - ix. CTD and XBT operations conducted within the buffer zone do not need to be isolated from non-UCH data, or repressed from the Okeanos Atlas. CTD and XBT files should follow the normal unrestricted processing procedures and archiving.
 - x. Daily updates are normally linked to the location of the ship at the time the update is posted. If daily updates are made during UCH surveys, no position shall be provided. If a position is required, the position should be posted as it makes sense, 5 miles outside of the extent of the survey area.
- c. Normal transmissions from the ship shall resume after the EX finishes UCH survey operations and exits the 5-mile buffer zone. **Exiting the buffer zone should occur at approximately the same location as entry to prevent obvious data location gaps pointing to UCH location.**

C. Post-Cruise Follow Up

1. Information Release

- a. No informal information about UCH should be released to the general public by the ship or personnel. This includes posting information and images on social networking sites like Facebook or personal blogs. Mapping data will be released to the public following the normal process and announcement of discoveries will be made through the appropriate offices and public affairs officials.

2. Standard Mapping Cruise follow-up where UCH is discovered

- a. The mapping team will provide a brief summary of the survey and target that includes a description of the survey, water depth, site location, site dimensions, bottom type, and images of the target at the best available resolution.
- b. The EX Cruise Coordinator and the OER Marine Archaeologist have an initial

consultation to discuss the nature of the UCH and its potential significance. This consultation may include other agencies or entities.

- c.** If UCH is determined not to be historically significant no change to standard data management procedures is required.
- d.** If UCH has the potential for historical significance but it is determined that no harm will result by disclosing position information, such as UCH in deep water, no change to standard data management procedures is required.
- e.** If UCH has potential historical significance and disclosing information about the site poses a threat, further discussions will be held on how to minimize potential harmful impacts, including data management decisions outlined in Data Archiving section of this document. The EX cruise Coordinator, a representative from the data management team, OER's marine archaeologist, a representative from the ONMS Maritime Heritage Program, and any parties with jurisdiction, management or other legal ties to the resource shall meet to determine what measures are needed to protect the UCH while minimizing impacts on the distribution of data and data products.

3. UCH Targeted Mapping Cruise Follow-Up

- a.** The mapping team will create a survey report that provides technical details on the survey, data processing and data products. It should contain a list of targets that includes site location, water depth, site dimensions, bottom type/topography, and images of the target at the best available resolution. Other helpful products include SD and kmz files.
- b.** The EX cruise coordinator, OER's marine archaeologist, a representative from the ONMS Maritime Heritage Program, archaeologists involved in the survey, and any parties with jurisdiction, management or other legal ties to the resource shall meet to discuss the potential historical significance of the UCH and the sensitivities of releasing data to the public that can be protected under Section 304 of the National Historic Preservation Act.
- c.** The outcome of this meeting will determine if it is necessary to protect site location information from public release.
- d.** When data can be released
 - i.** If the findings determine that releasing information and data on UCH is not a threat, development of products and data management should follow the guidelines for a standard mapping cruise.
- e.** When data should be protected
 - i.** If it is determined that a site is or has potential to be historically significant and eligible for nomination to the National Register of Historic Places, the location and data containing the location should not be released to the public.

- ii.* Data products that contain position information will be forwarded to the EX data management team where data and products will be stored in an archive with restricted access.
- iii.* Cruise plans, cruise reports, situation reports, mapping summary reports and other documents that are publically available outside NOAA or freely accessible within NOAA shall not provide location information for UCH or survey areas. In certain circumstances the lead archaeologist for the cruise may request that certain UCH sites are not mentioned in the public reports.

4. UCH mapping follow-up for National Marine Sanctuaries

- a.* When the EX conducts UCH work inside a National Marine Sanctuary the EX Cruise Coordinator shall inform the OER Marine Archaeologist, ONMS Maritime Heritage Program Director, Sanctuary Superintendent and Sanctuary Maritime Heritage Coordinator on the availability of data products and initial results of the survey. ONMS shall determine the sensitivity of the data and whether or not it can be disclosed to the public. Published metadata shall indicate the point of contact to access UCH data within the NMS system is the Director of the Office of National Marine Sanctuaries.

D. Data Archiving – See Appendix C

Appendix B: TELEPRESENCE-ENABLED ROV OPERATIONS

The following outlines the process for pre-cruise planning, field operations, post-cruise follow up, and data archival procedures for the following scenarios:

- When a cruise conducts ROV operations specifically targeted at UCH.
- When UCH is unexpectedly discovered on non-archaeological operation

A. Unexpected UCH Discovery

- During the Cruise: If UCH is unexpectedly discovered during an ROV dive, the onboard Expedition Coordinator should immediately contact OER's Lead Maritime Archaeologist, and the Archaeology Doctors-on-Call identified for that expedition. Those archaeologists should be engaged in the site investigation as soon as possible to provide information to help assess the site discovered. No changes to the data, video or onboard data acquisition processes should be made. A post-dive and post-cruise discussion will be held with the OER archaeologist to determine whether any datasets should be withheld from archive. (Section 2.D.II).
- **Follow-up when UCH is unexpectedly discovered**
 - a.** The EX Cruise Coordinator and the OER Marine Archaeologist will have an initial consultation to discuss the nature of the UCH and its potential significance. This consultation may include other agencies or entities.
 - b.** If UCH is determined not to be historically significant no change to standard data management procedures is required.
 - c.** If UCH has the potential for historical significance but it is determined that no harm will result by disclosing position information, such as UCH in deep water, no change to standard data management procedures is required.
 - d.** If UCH is or has potential historical significance and disclosing location information about the site poses a threat, further discussions will be held on how to minimize potential harmful impacts, including data management decisions outlined in the Data Archiving section of this document. The EX cruise Coordinator, a representative from the data management team, OER's marine archaeologist, a representative from the ONMS Maritime Heritage Program, and any parties with jurisdiction, management or other legal ties to the resource shall meet to determine what measures are needed to protect the UCH while minimizing impacts on the distribution of data and data products.

B. Cruises conducted with ROV operations specifically targeted at UCH.

1. Pre-Cruise Planning: ROV Exploration

a. Notifying the Team of their Responsibility to Protect Sensitive UCH Resources

Expedition members and OER personnel to have a legal responsibility to protect sensitive archaeological information (primarily location information) from untimely release.

For a planned UCH cruise, the EC shall notify the CO and each shall have responsibility for

ensuring personnel are aware of this responsibility. The EC shall provide an archaeology background document to familiarize personnel with the particular mission and requirements.

Appendix D details the range of existing accountability mechanisms already in place.

2. Pre-dive planning

- a.** Archaeologists will develop a dive plan based on the best available knowledge of the site that will maximize data recovery and minimize any potential impact to the site. The archaeology team will work closely with the cruise coordinator and deep submergence vehicle manager to develop and implement the plan. The plan should include:
 - I.** Objectives (cultural/interdisciplinary science)
 - II.** The types of sensors needed and data to be generated
- b.** As a rule ROV dives will not disturb or touch the shipwreck or cultural feature. Exceptions to this rule must discuss the rationale behind such a decision and incorporate it into the dive plan (collection of diagnostic artifacts or samples is sometimes conducted if the activity leads to better baseline characterization).
- c.** Prior to the cruise any permitting requirements should be identified and if required, permits must be procured.
- d.** Automated Information System (AIS): NOAA requires that the AIS feed which broadcasts information about the ship, including position, course and speed, must remain on at all times for collision avoidance and other safety reasons. Although the [International Maritime Organization](#)'s (IMO) Maritime Safety Committee condemns the Internet publication of AIS data, it is easily available for viewing. During the cruise planning phase the Expedition Coordinator will provide the AIS broadcast range on the EX to the chief scientist and science team. The science team, chief scientist, or other parties involved in a UCH mapping cruise should be made aware of this and decide whether the value of the operation merits acceptance of the potential issues/outcomes imposed. A Go/No-Go decision will be made based on this information.

C. Field Operations

- 1.** Exploration dives by ROV should be planned to collect optical and acoustic images without causing physical disturbance to the UCH. Representatives and leads from operational groups including the ROV, data/video, and telepresence teams, and ship operations should meet to discuss ROV operations and data collection.
 - a.** The guidelines for mapping operations should be followed to ensure site locations are not disclosed during field operations. SOPs with full operational details are available on the ship.
 - b.** A three-mile buffer zone shall be created around the UCH target or isolated survey box. The time at which the ship enters, and departs the three-mile buffer zone

needs to be recorded and provided to the Data Team Lead for post-processing use. Following work at the site, the ship will return to the site where it first entered the three-mile buffer zone to continue operations.

- c.** The following steps will be taken just prior to entering the five-mile buffer zone in order to stop broadcasting the ship's location while the survey is conducted:
 - I.** NOAA email events will be stopped (OMAO/ET)
 - NOAA Shiptracker: Disable/stop the e-mail updates from the ship going to OMAO / Shiptracker
 - *Okeanos Atlas*: Disable/stop the e-mail updates to NCDDC
 - SAMOS: Disable/stop the e-mail update to FSU containing METOC and flow-through data, etc.
 - II.** Telepresence Video Feeds (OER Telepresence team lead): Do not stream any feeds that include the ship's location, including but not limited to the SCS data screen, or any active mapping data acquisition screens, or video feeds. It is acceptable to stream video feeds that do not include the ship's location.
 - III.** Redirect Live Feed as needed (OER EC or CO): If highly sensitive features (human remains, evidence of human remain such as shoes or other accoutrements, highly valuable items, etc.) are going to be investigated or are unexpectedly encountered during the course of our seafloor investigation, the lead archaeologist, ROV Team Leader, Expedition Coordinator or Commanding Officer has authority to immediately switch the live feed from the ROV and Seirios camera sled to another camera on the ship.
- d.** Daily updates on the *Okeanos Atlas* are normally linked to the location of the ship at the time the update is posted. If daily updates are made during UCH surveys, no position shall be provided. If a position is required, the position should be posted as it makes sense, 3 miles outside of the extent of the site or survey area.
- e.** Normal transmissions from the ship shall resume after the EX finishes UCH survey operations and exits the 3-mile buffer zone. The point of exit should be as near to the point of entry as is feasible to minimize location data gaps pointing to the location of the UCH.
- f.** No informal information about UCH should be released to the general public by the ship or personnel. This includes posting information and images on social networking sites like Facebook, Twitter or personal blogs. Images, video and information on UCH will be released to the public following the normal process and announcement of discoveries will be made through the appropriate offices and public affairs officials.
- g.** In addition to the items listed, the ship sends out automated weather (autoIMET) observations every hour and manual weather observations every 6 hours with positions as a voluntary ship observer. These observations are pulled onto public sites by several different websites and Google Map apps. One example is sailwx.info. This is only accurate to the nearest decimal degree (6 nm). This level of accuracy is

not of concern.

D. Post-Cruise Data Management – Appendix C for detail

Following completion of the expedition, the Expedition Coordinator should have a follow-up call with the Data Management Team & OER lead archaeologist to review the datasets collected, confirm those that need to be withheld from public archive, and provide information to the data management team for associated metadata records.

E. Post-Cruise Follow-Up

1. Information Release

- a.** No informal information about UCH should be released to the general public by the ship or personnel. This includes posting information and images on social networking sites like Facebook or personal blogs. Images, video, and mapping data will be released to the public following the normal process and announcement of discoveries will be made through the appropriate offices and public affairs officials.
- b.** Determination of whether UCH is potentially eligible for nomination to the National Register of Historic Places, or eligible for protection under other legislation such as the Sunken Military Craft Act or National Marine Sanctuary Act, will take some time following completion of the cruise. Sensitive or potentially sensitive information about the UCH is to remain restricted until determination is complete. Following completion of the cruise, the lead Archaeologist will work with others to analyze the UCH data and conduct historical research to determine whether the UCH is eligible for nomination to the National Register of Historic Places.
 - I.** If the UCH is determined to be eligible, the lead Archaeologist will prepare the nomination for the NRHP process.
 - II.** If the UCH is determined to NOT be eligible, and protection of the site does not fall under other legislation, the Lead archaeologist will notify the data management team that site information can be made publicly available.

2. UCH Targeted Cruise Follow-Up

- a.** The EX cruise coordinator, OER's marine archaeologist, a representative from the ONMS Maritime Heritage Program, archaeologists involved in the survey, and any parties with jurisdiction, management or other legal ties to the resource shall meet to discuss the potential historical significance of the UCH and the sensitivities of releasing data to the public that can be protected under Section 304 of the National Historic Preservation Act. The outcome of this meeting will determine if it is necessary to protect site location information from public release.
 - I.** When location data can be released:
 - a.** If the findings determine that releasing information and data on UCH is not a threat, development of products and data management should follow the guidelines for a standard ROV cruise.

- II.** When location data should be protected:
 - a.** If it is determined that a site is or has potential to be historically significant and eligible for nomination to the National Register of Historic Places, the location and data containing the location should not be released to the public.
- III.** Data products that contain position information will be forwarded to the EX data management team where data and products will be stored in an archive with restricted access.
- IV.** Cruise plans, cruise reports, situation reports, mapping summary reports and other documents that are publically available outside NOAA or freely accessible within NOAA shall not provide location information for UCH or survey areas. In certain circumstances the lead archaeologist for the cruise may request that certain UCH sites are not mentioned in the public reports.

Appendix C: Post-Cruise Data Management

Data collected by OER that is considered sensitive will be protected from direct public release until such time as a final determination can be made as to permanent protection. Data in this state will be:

- Fully documented, so as to be independently understandable to users;
- Visible through publication of metadata records by OER;
- Accessible upon request to OER (controlled access by permission);
- Preserved in NOAA archives as ‘restricted’ (not available for direct public access).

These data will not be available for direct public access unless and until they are eliminated from consideration for nomination to the National Register of Historic Places (NHPA Section 304), or for protection under other legislation such as the Sunken Military Craft Act or National Marine Sanctuary Act.

If data are nominated and accepted for any official protection, then the exceptional status will be made permanent, and all documentation updated and finalized as such.

This section from Appendix A needs clean up

Data generated by the *Okeanos Explorer* Program is archived under a data management agreement with NGDC. Only data that has potential to reveal the nature and location of UCH shall be restricted from public access. In accordance with the data management agreement, sensitive data from the EX will have restricted access at NCEI. To assist researchers in discovering sensitive data NGDC will publish a metadata record (but not the data) that identifies a point of contact for access. Requests to access the data will be made to the Director of OER who may delegate to the OER marine archaeologist. In lieu of the OER marine archaeologist, the OER Director may delegate to the Director of the ONMS Maritime Heritage Program.

If data is found to be sensitive because it reveals the location of a historically significant cultural

resource, Section 304 of the National Historic Preservation Act provides that the head of a Federal agency or other public official shall withhold from public disclosure information about the location, character, or ownership of a historic property when disclosure may cause a significant invasion of privacy; risk harm to the historic property; or impede the use of a traditional religious site by practitioners. Data collected by the EX that is considered sensitive will be archived in a location where it can be withheld from public disclosure.

Data sets and associated products are housed in the appropriate NOAA archive; National Oceanographic Data Center, National Geophysical Data Center, National Coastal Data Development Center, National Climate Data Center, and the NOAA Central Library.

- Digital Atlas: NCDDC will develop appropriate metadata records to post on the digital atlas.
- CTD and XBT data collected during mapping operations conducted within the buffer zone will not be repressed from the *Okeanos Atlas* and will be held in a public archive.
- Cruise reports, cruise plans, mapping summary reports and other documents that are publically available outside NOAA or freely accessible within NOAA should not provide location information for UCH or survey areas.

This section from Appendix B needs cleanup

Start and end times for the 3-mile buffer zone surrounding a UCH site need to be provided to the data management team. Datasets containing sensitive location information will be restricted in their entirety, unless other parsing arrangements have been made. The following datasets may contain sensitive UCH location information and need to be reviewed, post-processed as appropriate, made restricted and pertinent metadata records created and made available.

- Multibeam, sub-bottom and single beam sonar data
- SCS Data Logs are to be restricted
- All ROV dive products (including associated sensor data) need to be restricted
- CTD rosette and *in situ* sensor datasets collected in relation to the UCH, and within the 3 nm buffer zone, need to be restricted.
- All imagery needs to be reviewed and geospatial imagery removed before being made public. Imagery with geospatial information should be restricted.
- Ship track? Other datasets?

Appendix D: NDA References

Expedition members and OER personnel to have a legal responsibility to protect sensitive archaeological information (primarily location information) from untimely release. The following summarizes the types of personnel who might be engaged in an *Okeanos Explorer* Expedition, where their responsibility to protect sensitive location information about UCH lies, and whether this responsibility has already been addressed or signature of a Non-Disclosure Agreement (NDA) is required to allow their participation in an expedition with planned UCH operations.

- If they are federally-employed scientists, they agreed not to disclose sensitive information and to adhere to federal laws as part of the terms of their employment with the federal government.
- The crew onboard the ship are under the CO's purview. On *Okeanos Explorer*, all crew are federal employees, and thus agreed not to disclose sensitive information and to adhere to federal laws as part of the terms of their employment with the federal government.
- All other members of the Mission team who are not federal employees and are engaged at-sea or ashore (including technicians, vehicle operators, students, etc.) are required to sign a non-disclosure agreement to protect sensitive cultural heritage information as part of their contract agreement.
- Other OER personnel who have access to data and information on the FTP site are either federal employees or contractors and need to be similarly reminded of their responsibilities. OER contractors signed an NDA as condition of employment with the federal government (this should be confirmed annually).

At the beginning of the expedition, all personnel need to be notified of their responsibilities:

MISSION PERSONNEL
(Notified by: Expedition Coordinator)

Employee	Accountability Mechanism for With-holding Sensitive Data	Action
NOAA Federal Employees	NOAA and Federal Contract	Reminder of contract, and provide archaeology background document.
Mission Contractors (UCAR, ERT Inc., 2020 Company LLC)	Non-Disclosure Agreement	Confirm all contractors signed NDA. Send reminder of contract and provide archaeology background document.
NOAA/Federal Scientists	NOAA and Federal Contract	Reminder of Contract, and provide Archaeology background document
Other Federal Scientists (BOEM, Navy, NPS, etc.)	Federal Contract	Reminder of Contract, and provide Archaeology background document
Other Mission Personnel and Scientists	Non-Disclosure Agreement	Get NDA Signed
Okeanos Explorer Crew (Notified by: CO or Desingnee)		
NOAA Federal Employees	Subject to NOAA and the ship's communications plans and protocols for sensitive data	CO sends out reminder of contract to ship via All Hands, and provides Archaeology background document
Other Federal Employees (e.g. Public Health Service)	Subject to NOAA and the ship's communications plans and protocols for sensitive data	CO sends out reminder of contract to ship via All Hands, and provides Archaeology background document
Wage Mariners	Subject to NOAA and the ship's communications plans and protocols for sensitive data	CO sends out reminder of contract to ship via All Hands, and provides Archaeology background document